FEBRUARY 1953

WIRE AND WIRE PRODUCTS

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COPPER WIRE DRAWIN
and ANNEALIN

Plus...

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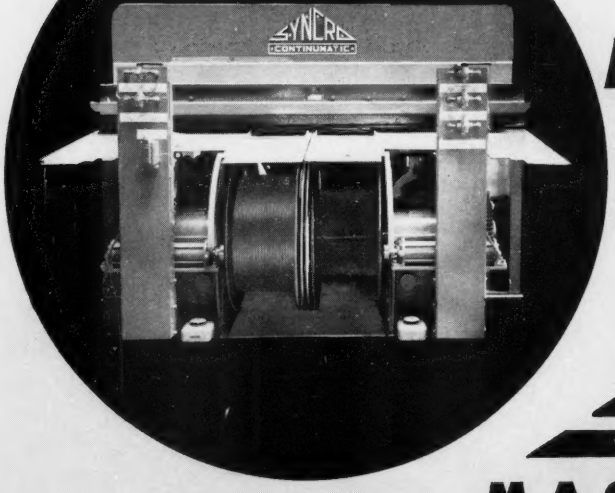
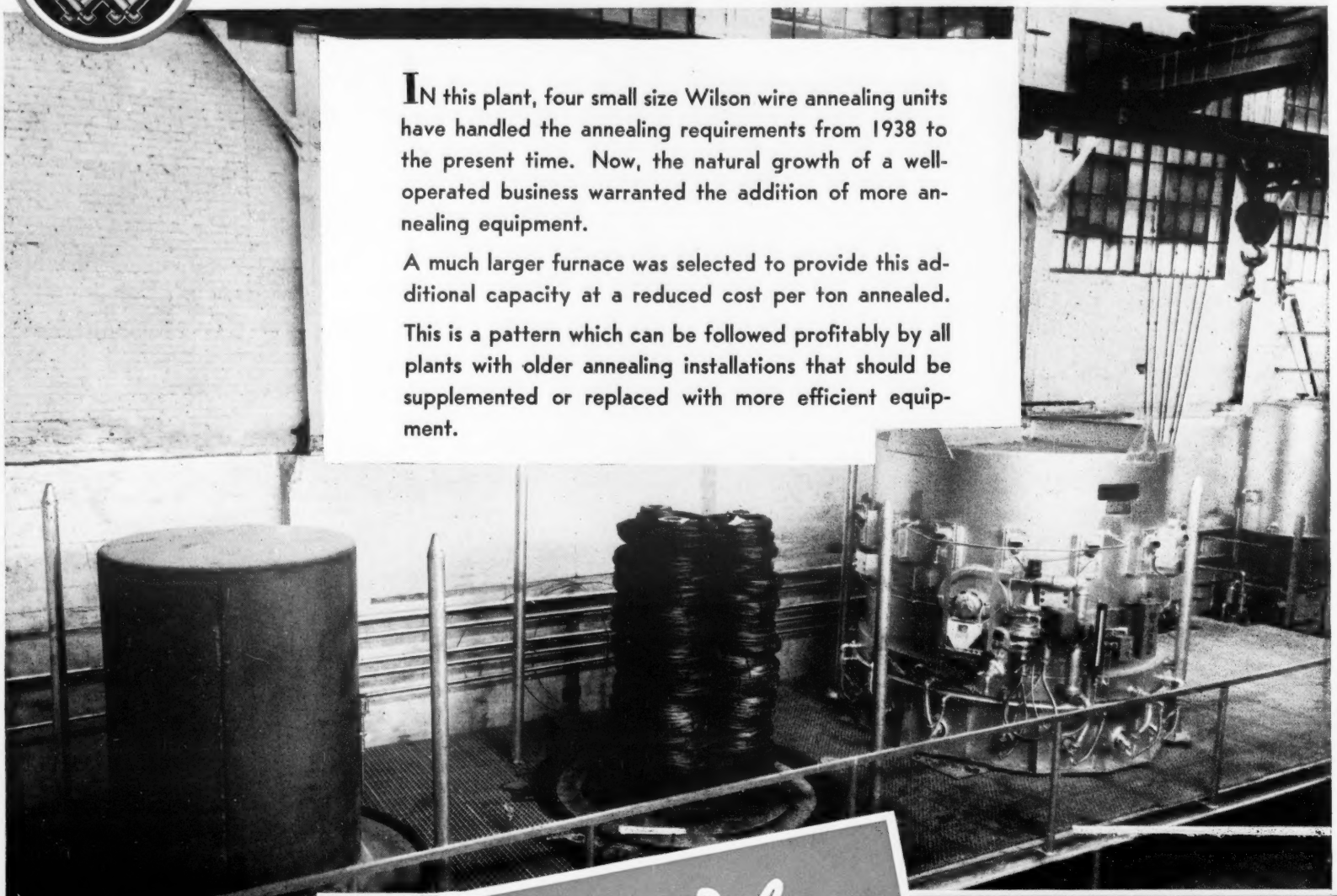


THIS year's
CHALLENGE !
to . . . OBSOLETI
method

SYNCRO
MACHINE COMPANY
PERTH AM[illegible]Y • NEW JERSEY • USA

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATIO

WILSON WIRE ANNEALING FURNACES



IN this plant, four small size Wilson wire annealing units have handled the annealing requirements from 1938 to the present time. Now, the natural growth of a well-operated business warranted the addition of more annealing equipment.

A much larger furnace was selected to provide this additional capacity at a reduced cost per ton annealed.

This is a pattern which can be followed profitably by all plants with older annealing installations that should be supplemented or replaced with more efficient equipment.

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RADIANT TUBE HEATING

ANNEALING PROCESSES

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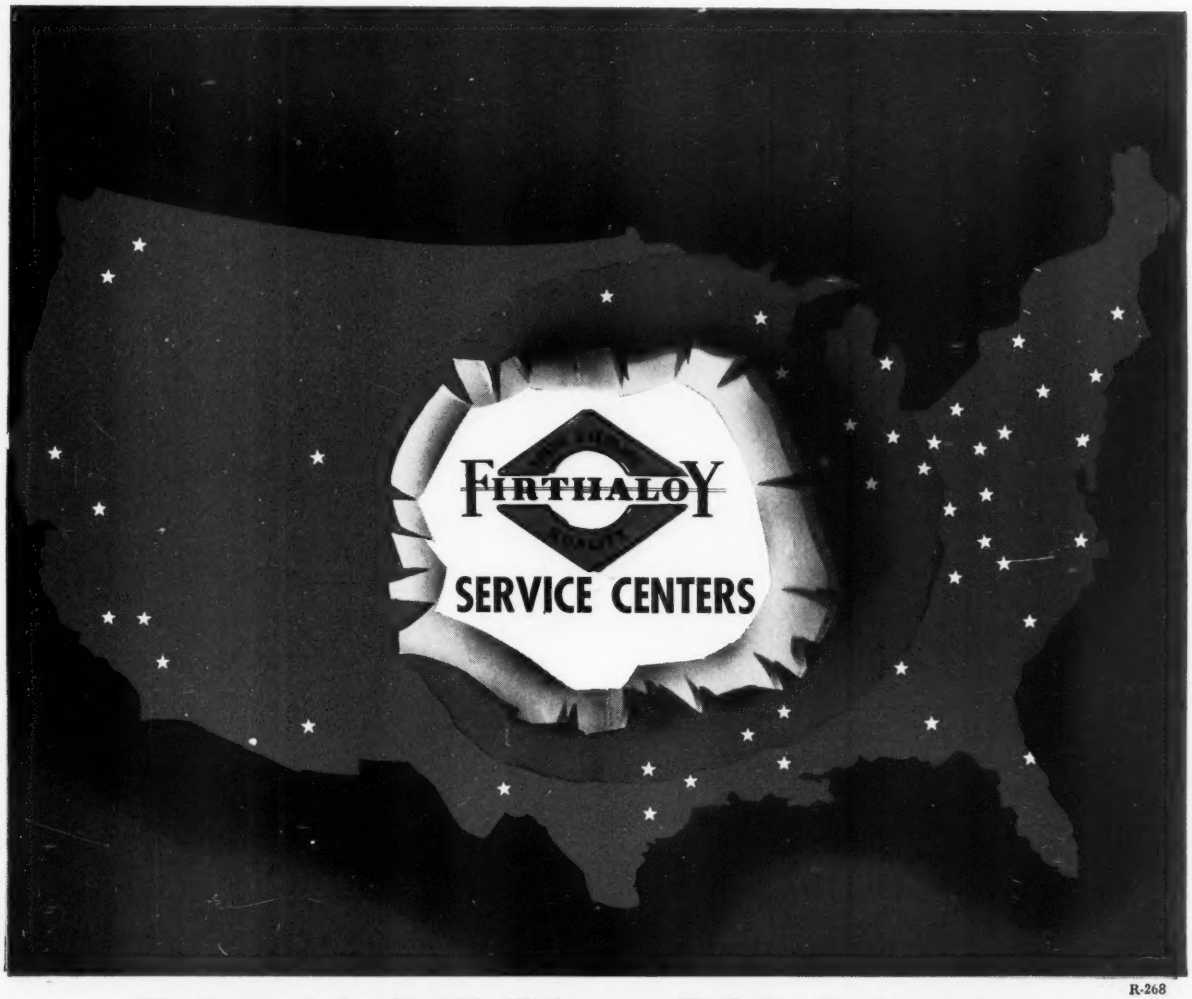

R-268

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- Finished Round Dies
- Finished Shape Dies
- Finished Mandrels and Mandrel Nibs
- Finished Deep Draw and Cartridge Case Dies
- Finished Cold Heading and Extrusion Dies
- Side and End Blocks
- Quills and Cut-Off Knives
- Compacting Dies
- Finished Nail Dies and Cutters

As always Firth Sterling maintains a sales and production engineering service, and development facilities to design, fabricate, and test new carbide products in your plant.

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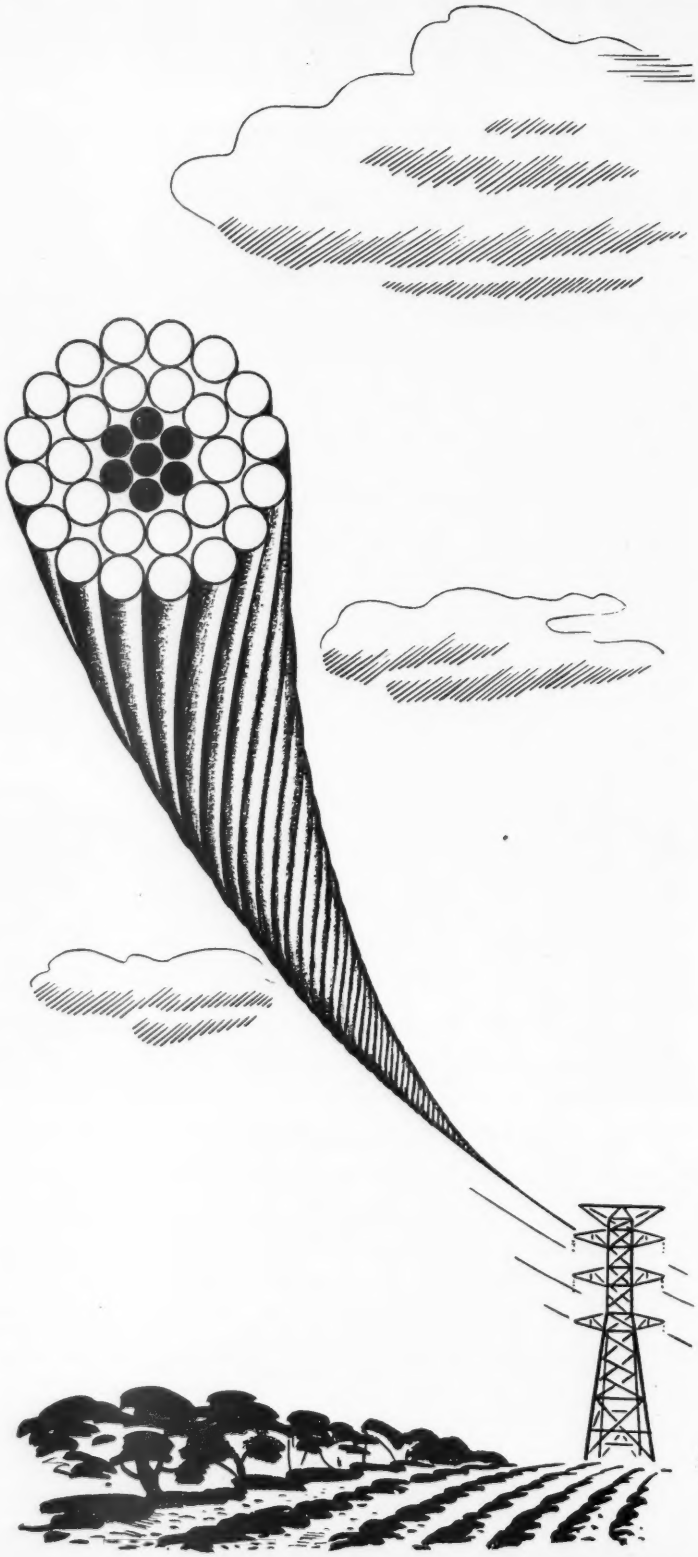
POWER Rides on STEEL



Many of the high-tension power lines you see gracefully spanning the countryside or reaching over industrial areas are aluminum conductor, steel reinforced—usually abbreviated to "ACSR." Aluminum strands borrow strength and support from a core of galvanized steel wire.

ACSR core wire is a Bethlehem specialty. To gain toughness and tensile strength, we use a high-carbon grade of basic open-hearth steel. To assure protection against rust, we supply core wire with a zinc coating of either the bethanized or hot-dip type. The bethanized coating, applied electrolytically, is especially suitable for this rugged job because of its purity and vise-tight bond.

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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

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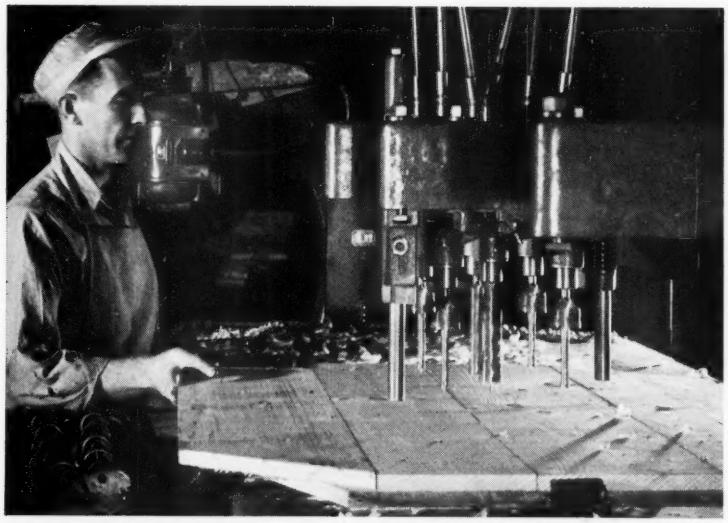

Above: **BORING MACHINE**

WOOD REELS
for
CABLE, ROPE
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WIRE

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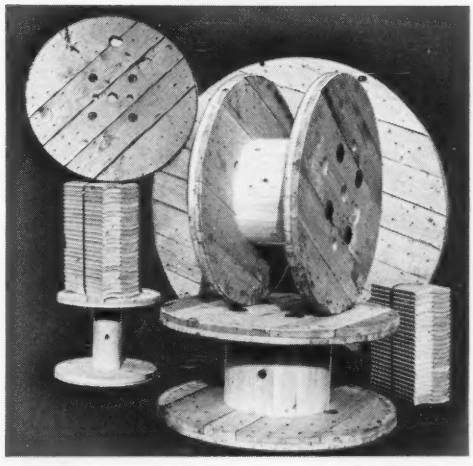

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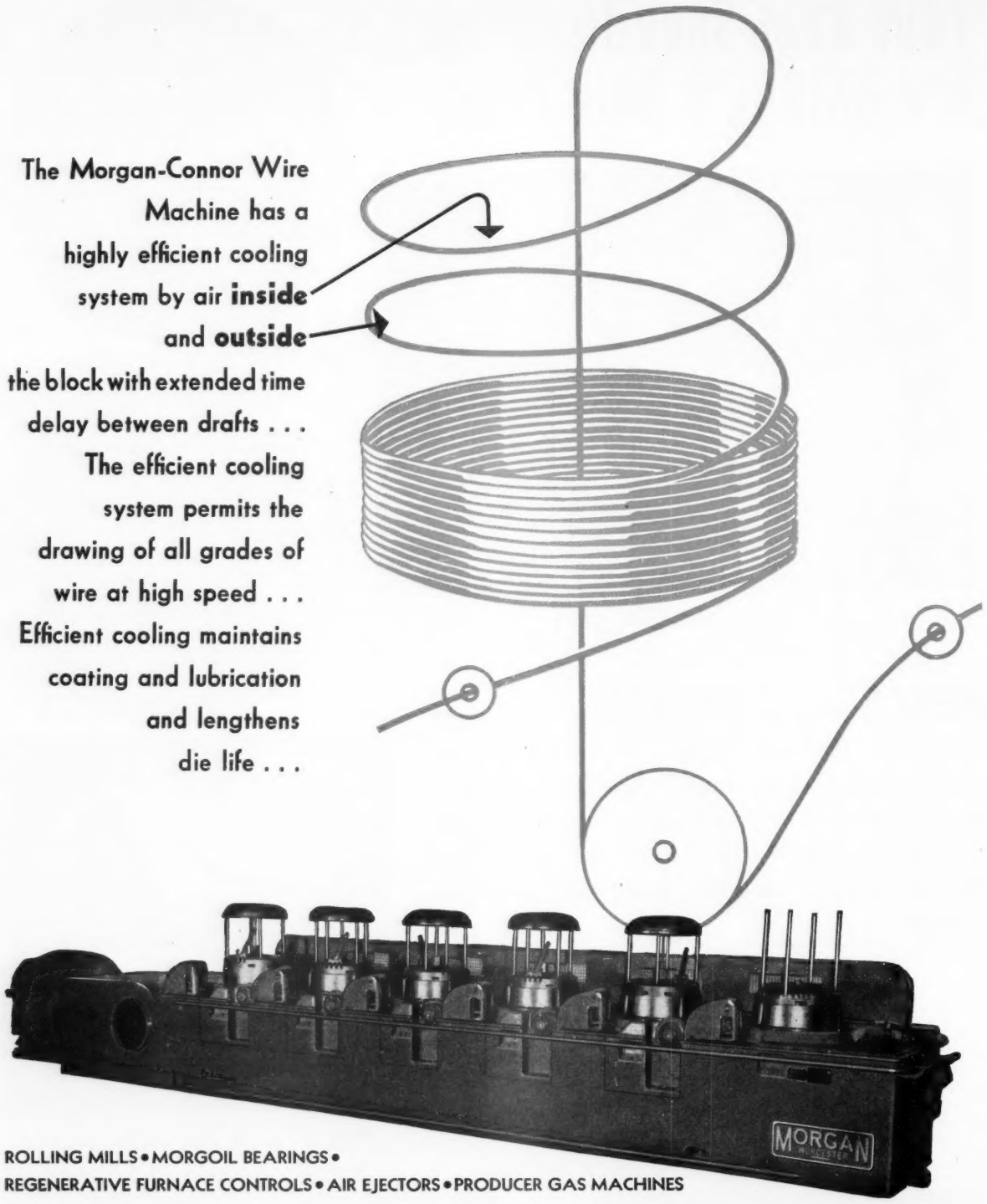

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Reg. U. S. Pat. Off.

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DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 28 FEBRUARY, 1953 No. 2

Designated as Official Publication By The Wire Association

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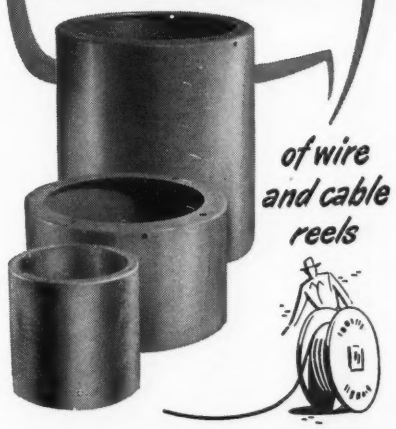
SIMPLE 4-STEP ASSEMBLY



of wire and cable reels

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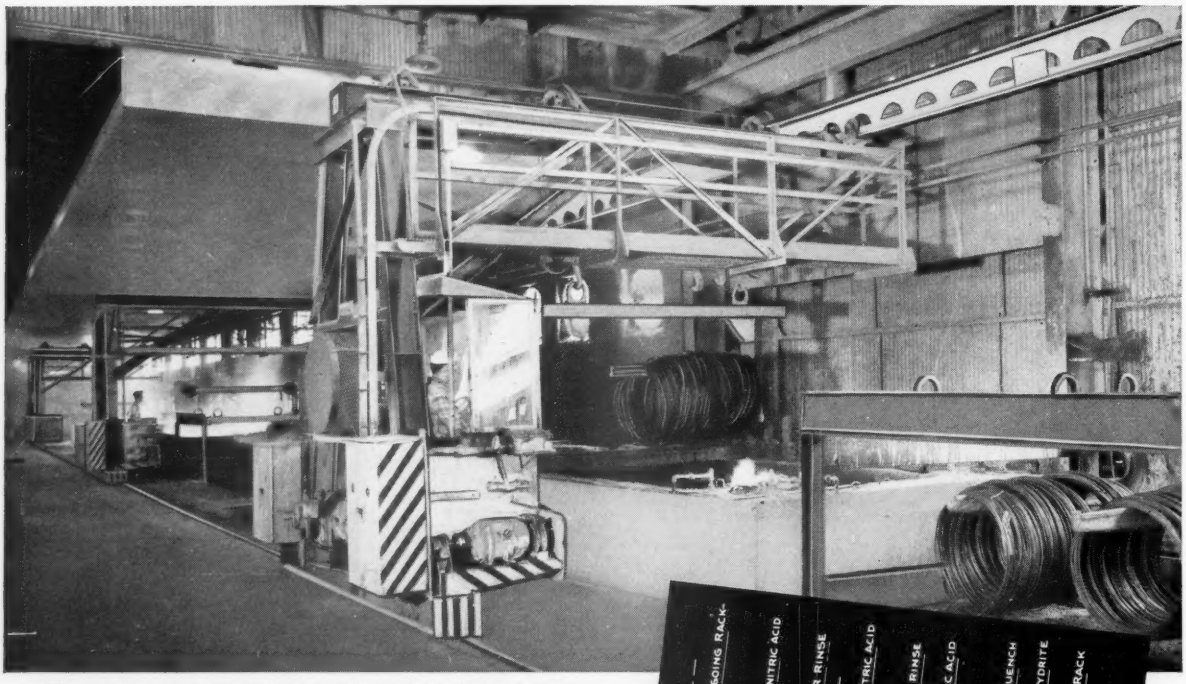
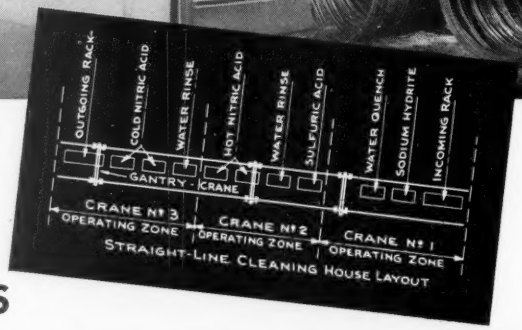
WITH STRAIGHT-LINE CLEANING PROCESS



Three gantry cranes operate at high speed around the clock in this cleaning house. Note how clean and orderly this room is. These are contributing factors to the high production rate secured.



THREE GANTRY CRANES ON SAME LINE PROVE HIGHLY ADVANTAGEOUS

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THE CLEVELAND CRANE & ENGINEERING CO.
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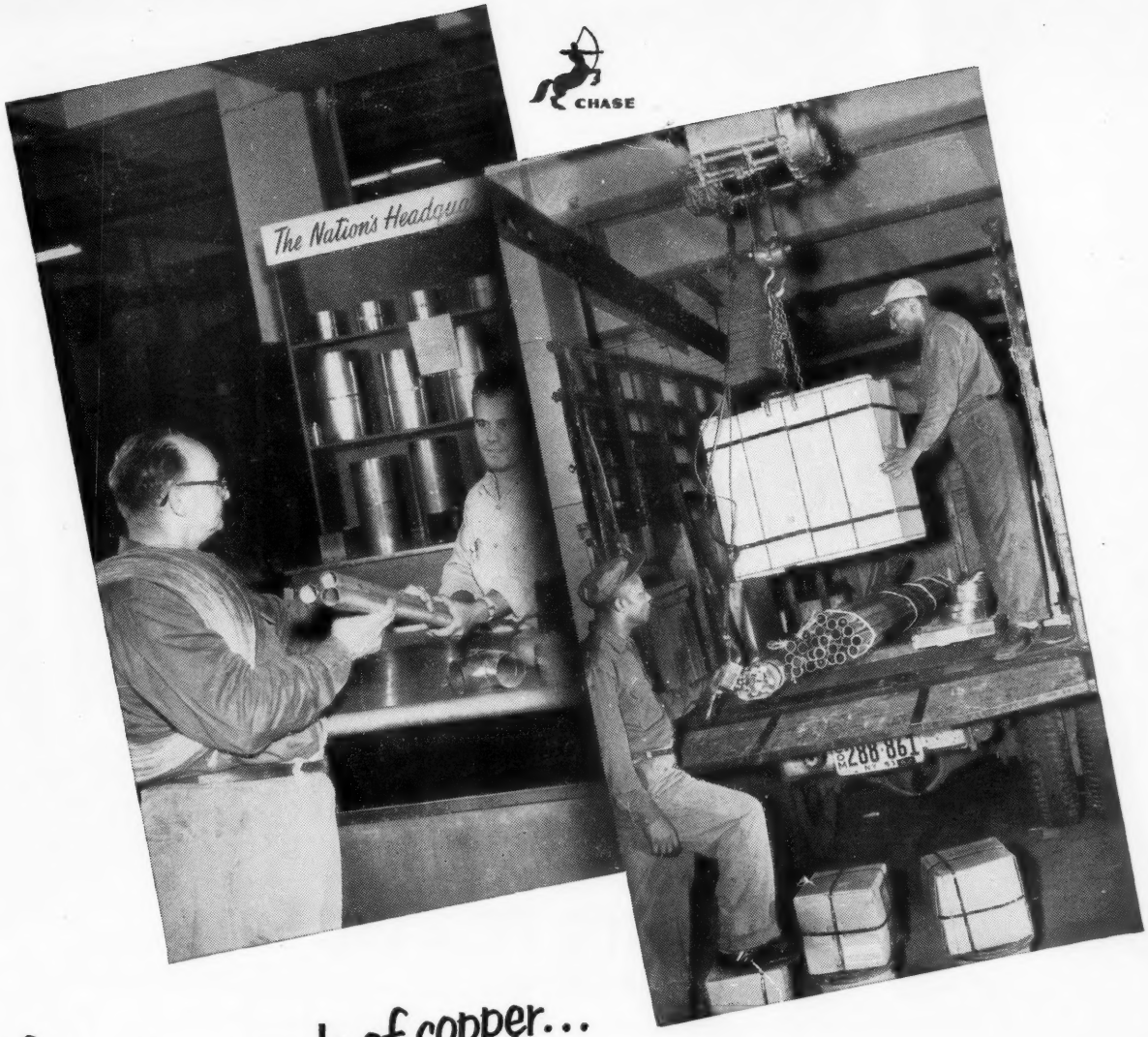

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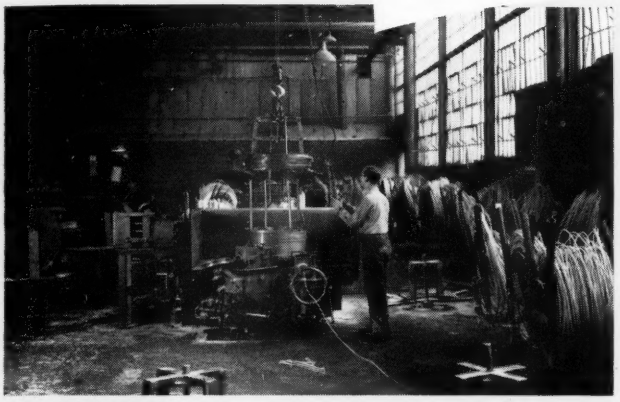

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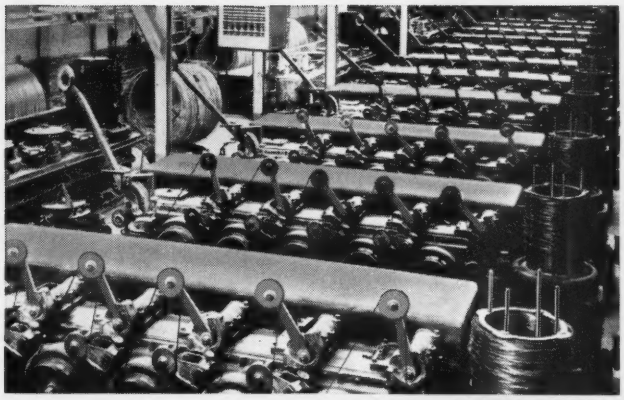

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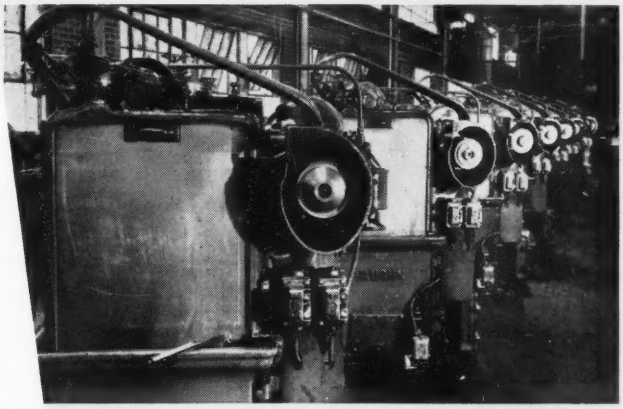

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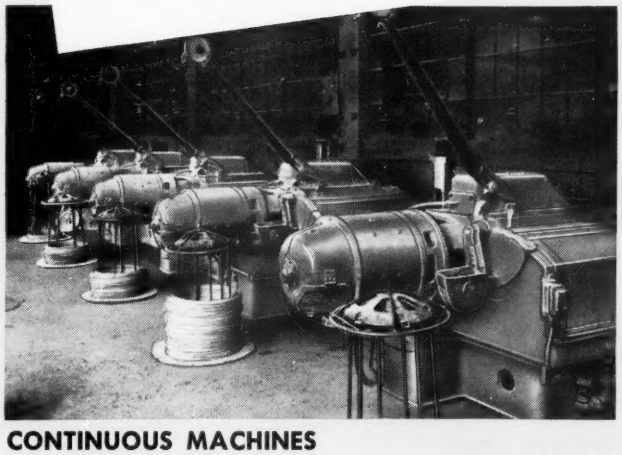
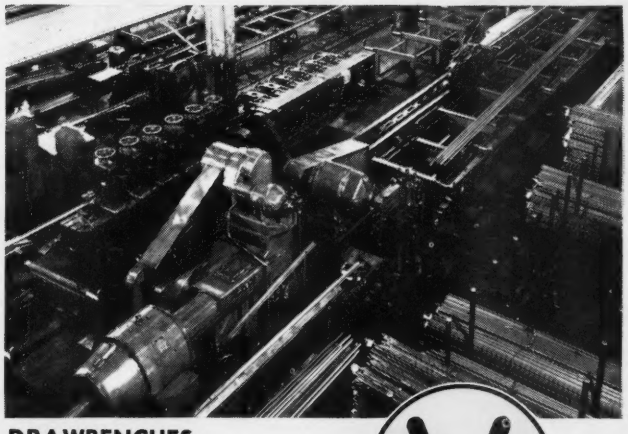


CONTINUOUS MACHINES



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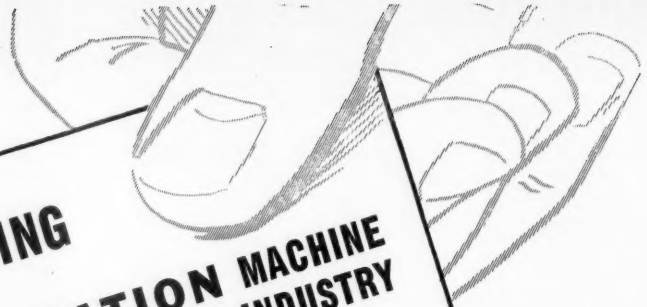
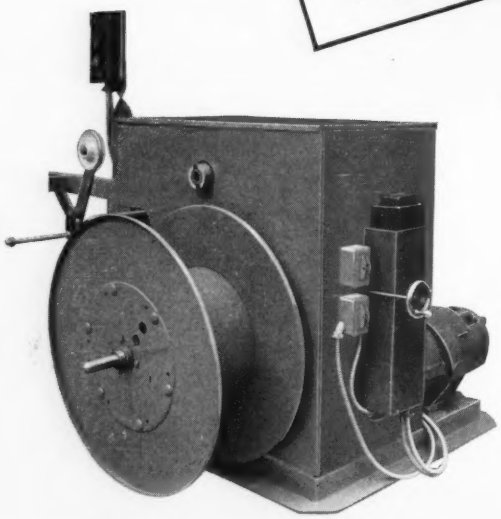
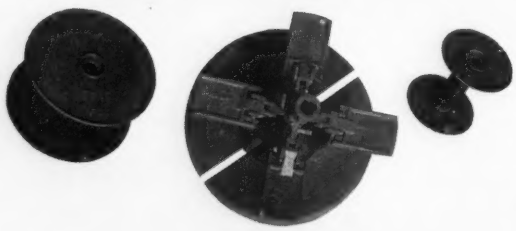


THE

DAVIS REELER AND RE-SPOOLER





THE NEW DAVIS REELER AND RE-SPOOLER

is equipped with a Davis predetermined counter for recording production. Stops automatically at any selected footage. A tachometer can also be furnished to indicate speeds.

This new combination machine, designed and developed as a result of Davis engineering research, is the last word in efficient and economical production. Of all welded steel construction, the combination is rugged, precision made and vibrationless.

Designed for use with the completely automatic DAVIS SPARK TESTING EQUIPMENT with your tinning or other present equipment. Adapted for use with any type collapsible coiling head up to 30″ diam.

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5. New ELECTRONIC CONTROLLER starts machine with low torque factor. Avoids stretching and/or breaking of wire.
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8. Constant footage device supplied if desired.

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HARNESS TESTERS • PAY-OFFS • TRAVERSES

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PROGRAM

OF THE TRENTON REGIONAL MEETING OF THE WIRE ASSOCIATION

APRIL 16 and 17, 1953, STACY-TRENT, TRENTON, N. J.

THURSDAY, APRIL 16th:

8:00 A.M.—Registration Desk open from 8:00 A.M. to 6:00 P.M.

12:00 Noon—Board of Directors' Luncheon

1:30 P.M.—Technical Session:

CHAIRMAN

H. J. Jacobson, Director of Packaging and Loading, American Steel & Wire Div., U. S. Steel Corporation, Cleveland, Ohio.

PAPERS

"Packaging of Wire and Wire Products" by H. A. Andrews, Special Engineer, Bethlehem Steel Company, Bethlehem, Pa.

"Mechanical Handling at John A. Roebling's Sons Corporation" by John Maisch, Wire Mill Foreman, John A. Roebling's Sons Corp., Roebling, N. J.

6:00 to 7:00 P.M.—Cocktail Party

7:00 P.M.—Banquet at the Stacy-Trent Hotel. Speaker to be announced later.

FRIDAY, APRIL 17th: **PLANT TOURS**

9:00 A.M.—Busses will leave the hotel for the following inspection tours:

TOUR A: — Ferrous Division—to the Roebling Works of John A. Roebling's Sons Corp., Roebling, N. J.

TOUR B: — Non-Ferrous Division—to the mill of Crescent Insulated Wire and Cable Company, Trenton, N. J. Note: If enough people are interested in visiting the Roebling copper wire mill in the afternoon, a trip there will be arranged to follow the visit to Crescent.

PLANS FOR THE LADIES

An auxiliary tour for the ladies present is being arranged so that those coming with members and guests may be entertained while the men are attending other functions. Some points of interest will be the British Barracks, the Battle Monument, the Trent House, Pennsbury Manor (William Penn's home) and Washington Crossing Park. Luncheon will be at Bucks County's Bohemian Village in New Hope, Pa.

FEES: A single charge of $8.50 will cover registration, banquet, luncheon, cocktails and busses for the men.

A single charge of $6.50 will cover the tour, luncheon and the banquet for the ladies.

THE PROGRAM COMMITTEE

C. J. Murray, Jr., Vice Pres., Crescent Wire and Cable Company

R. H. Saviers, Works Met., John A. Roebling's Sons Corp.

L. D. Seymour, Pres., Marshall Richards Machine Co.

R. S. Worth, Manufacturing Mgr., John A. Roebling's Sons Corp.

G. A. Stone, Office Manager, Marshall Richards Machine Co., Inc.

Reservation cards will be mailed to members of The Wire Association.

If not a member and you want to attend, write for one to

THE WIRE ASSOCIATION

RICHARD E. BROWN, *Executive Secretary*

453 MAIN STREET **STAMFORD, CONN.**

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STANDARD SIZES

Flange	Traverse	Barrel	Arbor
2½"	3" 3¼"	1¾"	.628"-.633"
3"	3" 3¼" 3½"	1¾" or 2"	.625"-.633"
4¼"	3" 3¼" 3½"	3¼"	.635"
4½"	3" 3¼" 3½"	2½"	.635"
4½"	6"	2½"	.635"
5"	2¾" 3"	3.880"	.531"
6"	3" 3¼" 3½"	3½"	.635"
6"	3" 3¼" 3½"	3½"	3"
6"	6"	3" or 3½"	.635"
6"	6"	3½"	3"
6½"	3" 3¼" 3½"	3½"	.635"
6½"	3" 3¼" 3½"	3½"	3"
6½"	6"	3½"	.635"
6½"	6"	3½"	3"
7"	3" 3¼" 3½"	3½"	.750"
7"	6"	3½"	.750"
8"	3½" 6" 6¼"	4"	3" or 3¹³⁄₁₆"
8¼"	3½" to 7½"	4"	3.630"
10"	6"	5"	Optional
12"	6"	6"	Optional

Light weight, drawn Aluminum Alloy

Here they are! A complete line of ACROPAK SPOOLS... any size for any need

Our job is to help wire manufacturers reduce spooling costs and we've built up a record with these strong, lightweight, drawn Aluminum alloy spools. A *complete* line—any size you specify—with special emphasis now on big sizes to meet the trend towards larger packaging for economy. ACROPAK spools have reduced operating and shipping costs for others—why not for you, too?

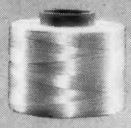
Do you need special sizes? We have the engineering experience and tool room facilities to design and make any special spool you may need.

ACROMETAL PRODUCTS INC.

Division U. S. Bobbin and Shuttle Co., 616 Fifth Street N., Minneapolis 1, Minn.

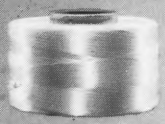
SERVING PACKAGE
No. 5023

STRAIGHT-EDGE
BRAIDER No. 42



SERVING PACKAGE
No. 51

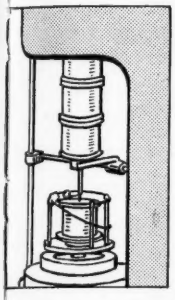
STREAMLINE BRAIDER
No. 43



SERVING PACKAGE
No. 53

TWISTER TUBE
No. 71

CONSISTENT UNIFORMITY.... a valuable feature of this VITRON GLASS YARN package



Try this Vitron package on your serving machine. You'll find each strand laid parallel and the ribbon properly spaced for fast application and a smoother finished wire.

At one glance, you can see that a great deal of care goes into Vitron packaging to maintain consistent uniformity. After use on your machine, you'll recognize the benefit to you in uniform build-up and coverage in your high speed wire processing operations.

All this great precision in Vitron Yarns starts with production of the basic glass fiber. Glass Fibers Inc. uses its own independent electronic-extrusion process to produce filaments of consistent uniformity. A variety of sizes is produced —450's, 300's, 225's, and 150's—and plied into a full range of yarns. Low twist and regular constructions are standard with Vitron. In all, Glass Fibers now prepares eleven different types of serving packages, each one designed for smoother operation in your machines.

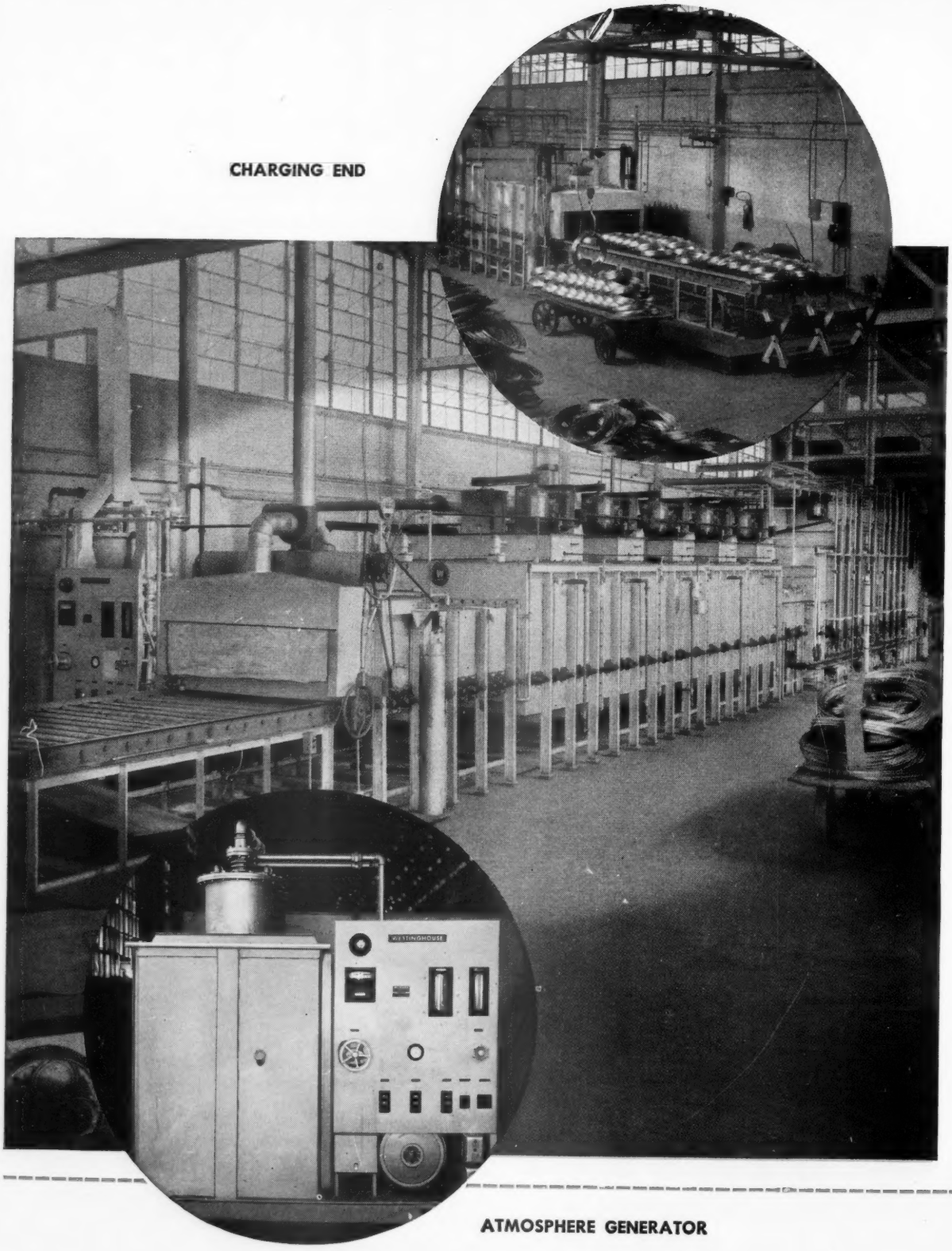
For information and samples write a note today to Glass Fibers Inc., 1810 Madison Avenue, Toledo 2, Ohio.

- *strands laid parallel*
- *smooth build of package end*
- *spaced properly for firmness*

GLASS FIBERS INC.

Makers of glass fibers by the ELECTRONIC-EXTRUSION process ... developed, patented and used exclusively by Glass Fibers Inc.

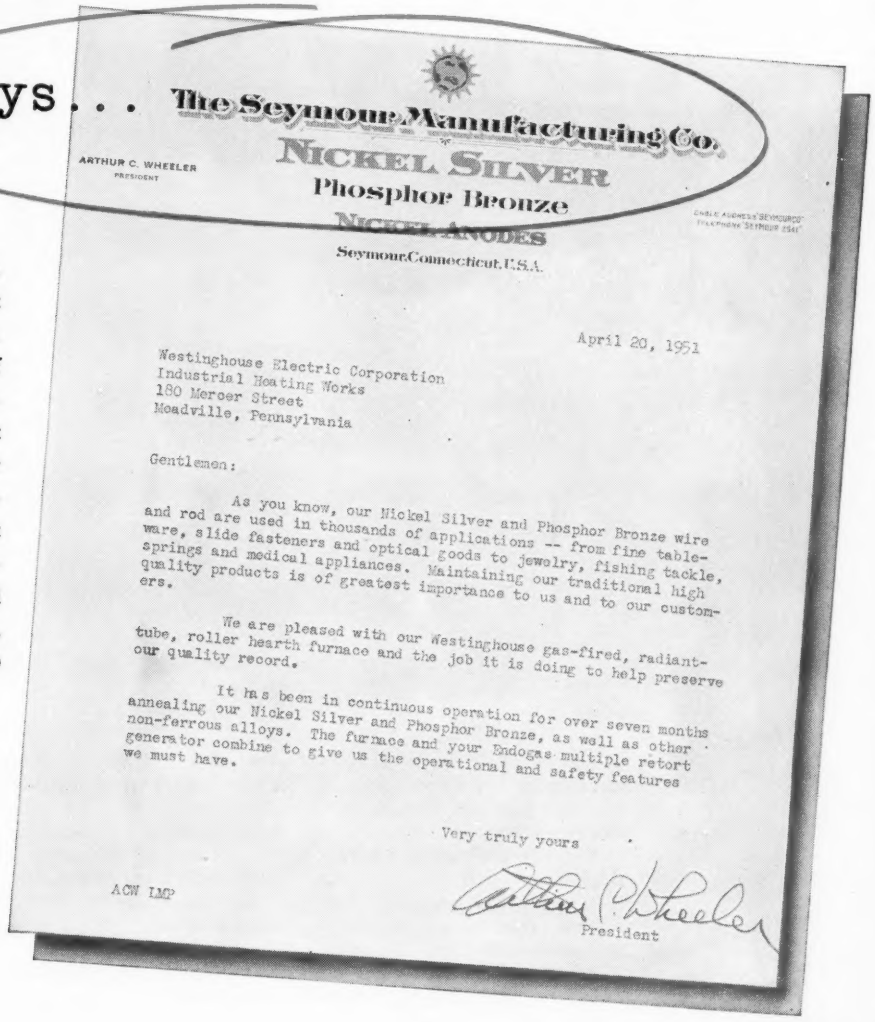
VITRON Yarns • Rovings • Micro-Fibers • Pipe Wraps • Industrial Mat • MICROLITE Thermal-Acoustical Insulation • DURAMAT Vapor Barriers • VIBRAGLASS Machinery Mounting and Packaging Materials • COUSTIC-AIRE and THERMO-JET Aircraft Insulations.



ATMOSPHERE GENERATOR

"Gives us operational and safety features we must have"

says . . .



The Seymour Manufacturing Co.

ARTHUR C. WHEELER
PRESIDENT

NICKEL SILVER
Phosphor Bronze
NICKEL ANODES

Seymour, Connecticut, U.S.A.

April 20, 1951

Westinghouse Electric Corporation
Industrial Heating Works
180 Mercer Street
Meadville, Pennsylvania

Gentlemen:

As you know, our Nickel Silver and Phosphor Bronze wire and rod are used in thousands of applications -- from fine tableware, slide fasteners and optical goods to jewelry, fishing tackle, springs and medical appliances. Maintaining our traditional high quality products is of greatest importance to us and to our customers.

We are pleased with our Westinghouse gas-fired, radiant-tube, roller hearth furnace and the job it is doing to help preserve our quality record.

It has been in continuous operation for over seven months annealing our Nickel Silver and Phosphor Bronze, as well as other non-ferrous alloys. The furnace and your Endogas multiple retort generator combine to give us the operational and safety features we must have.

Very truly yours

ACW LMP

Arthur C. Wheeler
President

Gas-fired or electric, there's a Westinghouse Furnace to meet every heat-treating need. Select from a wide variety of standard units; or special designs can be prepared to meet particular needs. It's your assurance of an unbiased answer to your all-important problem. Westinghouse Electric Corporation, Industrial Heating Division, Meadville, Pennsylvania. J-10370

YOU CAN BE SURE... IF IT'S

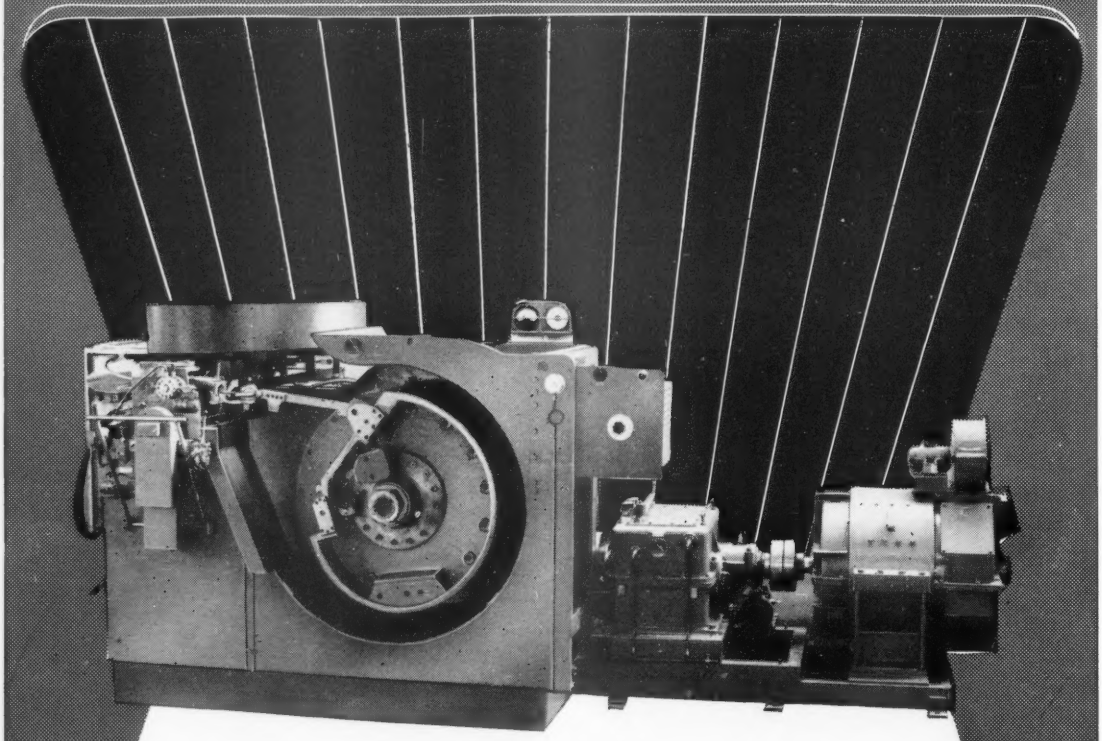
Westinghouse

HEAT-TREATING FURNACES

WESTINGHOUSE W

IF YOUR PRODUCT CALLS FOR HEAT-TREATING . . . IT CALLS FOR A WESTINGHOUSE FURNACE . . . GAS OR ELECTRIC

MARSHALL RICHARDS TUBE BLOCKS



We illustrate a large Horizontal Bull Block specially designed and developed and now production tested on both sides of the Atlantic, for drawing non-ferrous tubes.
Every possible refinement to aid high consistent production is incorporated. The machine is the type H.66.T. with a 54" diameter block which draws tube from about 2" o/d maximum using floating plugs. It has a 120 H.P. motor and provides drawing speeds between 150 and 1350 feet per minute. The tube swift is incorporated and the machine is a production unit as soon as it is installed.
A number of standard machines are building in advance of customers order thereby enabling us to offer reasonable deliveries.

MARSHALL RICHARDS MACHINE CO. INC.

1110 SOUTH BROAD STREET : TRENTON 10 : NEW JERSEY
Telephone: TRENTON 6-9478 Telegrams: MARICH TRENTON

MR 77

"Sure, he's contented! With Swift's Soaps, he knows he has the right soap for his wire drawing needs!"

That's one good reason why it pays to deal with Swift. In Swift's Soap line, you'll find the *right* soap for every job. And every soap produced by Swift for wire drawing offers efficient lubrication . . . minimum dusting . . . uniformly dependable quality. There are other good reasons, too.

● **Progressive research in soap development.** Swift's technical laboratories work consistently to maintain high product quality . . . to develop even better soaps for industry.

● **Prompt, resourceful service.** Swift's distribution points are strategically located from coast to coast. There's one near to you — ready to give you fast delivery on these and other fine Swift's Soaps:

Powdered White Ribbon • Guaranteed Powder • Snap Heavy Duty Wire Drawing Powder No. 282 • No. 559 Powdered Soap

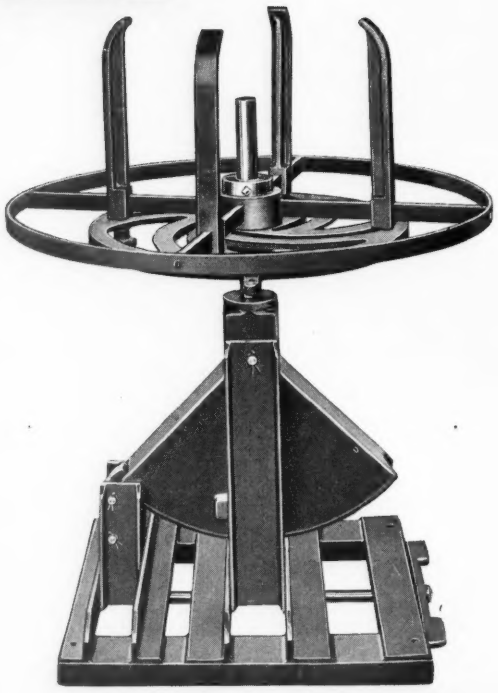
SWIFT & COMPANY
Soap Department, Chicago 9, Illinois

Call **SWIFT** first for **SOAPS**

SHUSTER

Universal
WIRE REEL
PATENTED

Saves Stock
Speeds Production



Built for Safety & Service

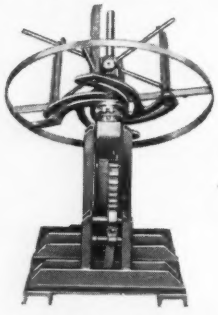
Counter balanced for simple one-man loading. The weight does practically all the lifting.

Smooth running, vertical, horizontal or angle feed. The reel is mounted on ball bearings for trouble-free take off at any angle within 90°.

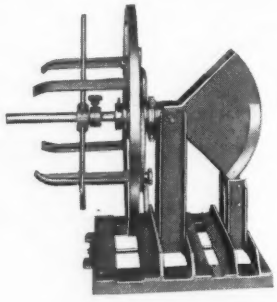
Quick adjustment to coil diameter. Simply loosen lock nut on one arm and turn cam plate in or out. This also self centers the coil.

Safe, convenient, positive controls. Built-in friction drag brake can be hand set easily. Prevents snagging. Foot treadle locks and unlocks counter weight. Working level of coil adjustable from any position.

Rugged construction—long service life. Base of welded steel. Heaviest gauges used throughout. All parts guaranteed.



Angle position, showing how Reel centers autometically.



Loading position, with counter balance locked in "up" position.

A REEL OF MANY USES

The Reel illustrated is for round stock. By using a different type Spider, this Reel can also be used for flat stock in connection with Power Presses, or Automatic Machines using ribbon stock, and is very desirable for inclinable Power Presses which require stock placed at the angle of feed.

EASIER TO LOAD
SMOOTHER FEED
DEPENDABLE CONTROL

GENEROUS CAPACITY

Smallest inside diameter	10"
Largest inside diameter coil	22"
Largest outside diameter coil	36"
Will take coils to 400 lbs.	
Adjustable from 30" to 40" in height.	
Weight, approximately	450 lbs.

Also

AUTOMATIC WIRE STRAIGHTENING & CUTTING MACHINES

Manufactured by **METTLER MACHINE TOOL, INC.**

132W LAWRENCE ST., NEW HAVEN, CONN.

New York Office: Eleven Broadway, Tel. WHitehall 4-5480

New Technical Data!

Mettler Machine Tool, Inc.
132W Lawrence St., New Haven, Conn.

Gentlemen: Please send us technical data on ☐ Wire Reels, ☐ Straighteners. We use wire from ..... " to ..... " dia. in lengths from ..... to ..... .

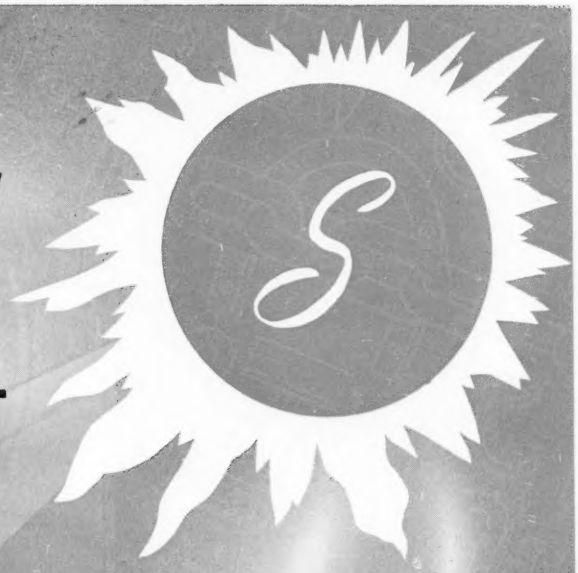
Name: .....

Company: .....

Address: .....

STAYS BRIGHT AS DAY ! WITH

STANDARD'S BRIGHT WIRE COMPOUNDS



STANDARD INDUSTRIAL COMPOUNDS COMPANY has pioneered most of the outstanding contributions to better wire drawing through better lubricants. Consult with **STANDARD** for the solution of your difficult problems. We welcome your inquiries.

STANDARD WIRE DRAW NO. 15

A new and different Compound for wet drawing, made from new and different materials that have a natural affinity for metals, a natural wetting-out characteristic, without the addition of a wetting agent.

Protects the wire from oxidizing for considerably longer periods than conventional compounds. Preserves the bright finish on copper coated or liquor finished wire and prevents tarnish on copper or brass wire for longer periods of time.

Below are some of the advantages of this compound:

A. Small amounts needed. Due to the natural affinity for metal small amounts of this compound are needed. Draws high carbon wire at high speeds with a fat content as low as .30 per cent, because of this affinity for metal and the natural wetting-out characteristics.

B. Low pH value.

C. Protects steel wire from rusting and copper coated and liquor finished steel wire from oxidizing. Protects copper and brass wire from tarnishing.

D. A clean compound. Keeps equipment clean and drawn wire has a clean finish.

Contact one of our representatives below or our home office for details on this new compound and a sufficient quantity for test will gladly be furnished.

Bruce W. Siemon
2400 Morrow Pl.
Pittsburgh 34, Pa.

John A. Moritz, Jr.
4600 W. Ferdinand St.
Chicago 44, Ill.

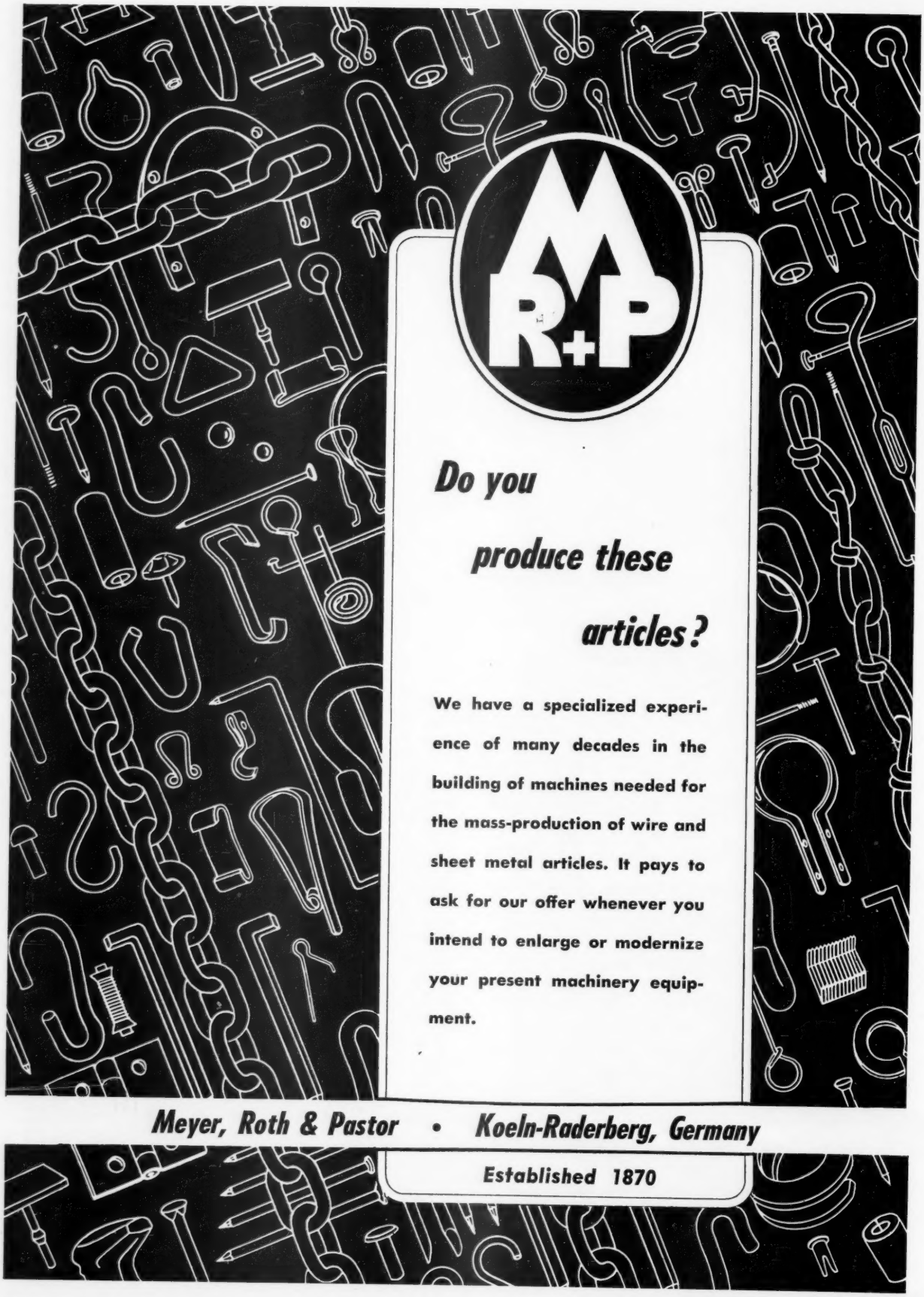
Earl A. Bowers
5536 Lisette
St. Louis, Mo.

Charles P. Orr
Caledonia Park
Fayetteville, Pa.

Standard Industrial
Compounds Co.
Millbury, Mass.
Arthur J. O'Mara

wire drawing lubricants **Standard** INDUSTRIAL COMPOUNDS CO., INC.

4600 WEST FERDINAND STREET
CHICAGO 44, ILLINOIS


M
R+P
Do you
produce these
articles?
We have a specialized experience of many decades in the building of machines needed for the mass-production of wire and sheet metal articles. It pays to ask for our offer whenever you intend to enlarge or modernize your present machinery equipment.
Meyer, Roth & Pastor • Koeln-Raderberg, Germany
Established 1870

WIRE INSULATING EXTRUDERS

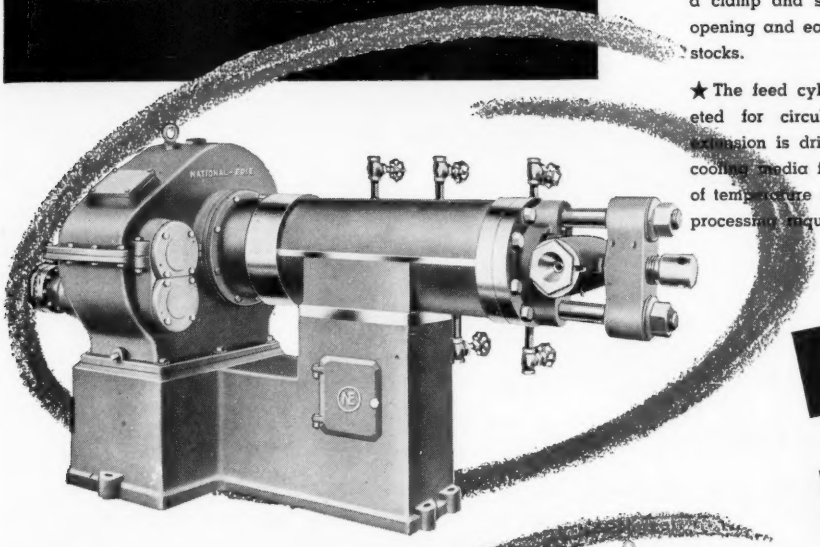
The National Erie extruder has been developed, after years of experience in design and use, into a machine with outstanding production features:

★ Drive gearing with precision cut gears and heavy duty thrust bearings of ample capacity have proved the superiority of National Erie design through years of trouble-free operation.

★ Anti-corrosive abrasion resistant cylinder liners and Stellite tipped screws insure long life.

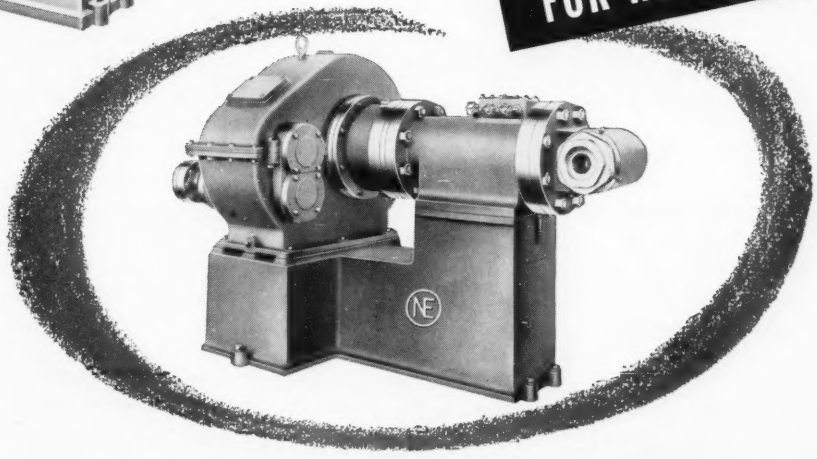
★ The plastics insulating extruder is equipped with a clamp and swing type head which permits quick opening and easy access for cleaning when changing stocks.

★ The feed cylinder on the plastics machine is jacketed for circulation of water and each cylinder extension is drilled for circulation of the heating and cooling media for zone temperature control. A choice of temperature control systems is available to suit the processing requirements of any material.



FOR PLASTICS

FOR RUBBER



A typical 4½" plastics insulating machine is illustrated above. A typical 3½" rubber insulating machine is illustrated at the right. Both of these machines are available in sizes 1½", 2½", 3½", 4½" and 6". Other sizes available as special designs.

NATIONAL ERIE STAFF JOINS HALE AND KULLGREN, INC.

The engineering organization of National Erie, including personnel, drawings and records, have transferred to the offices of Hale and Kullgren, Inc., at 613 East Tallmadge Avenue, Akron, Ohio, and are available to you for prompt service on your processing problems. Complete service on parts and information for all existing National Erie equipment is available.

Complete service on National Erie equipment

SALES • ENGINEERING • MANUFACTURING

HALE AND KULLGREN INCORPORATED

P. O. BOX 1231 • AKRON, OHIO

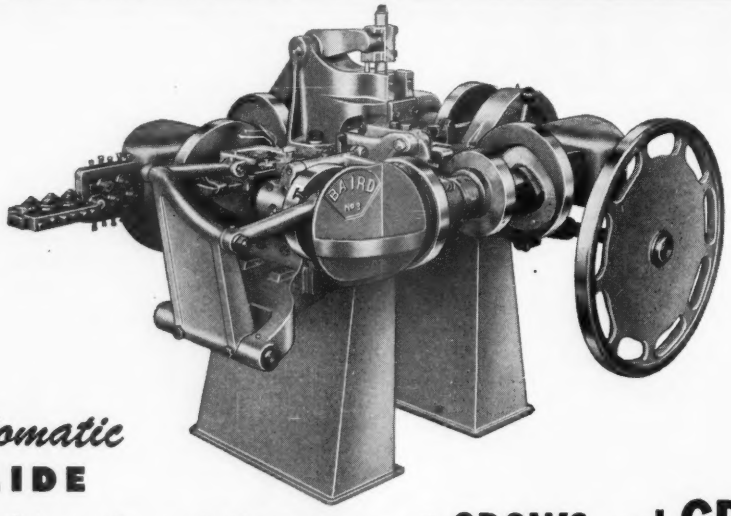
Aetna-Standard

THE AETNA-STANDARD ENGINEERING CO.
PITTSBURGH, PA.

Plants in Warren, Ohio
Ellwood City, Penna.

ASK BAIRD ABOUT IT!

HIGH PRODUCTION TOOLING



BAIRD *Automatic* FOUR SLIDE

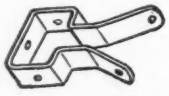
. . . the Machine that GROWS and GROWS and GROWS

Start, if you wish, with the standard (stocked) 4-slide, which in itself is remarkably versatile in forming hundreds of articles from wire and ribbon metal.

Then when conditions demand . . . a call for even greater versatility of production or a change in certain products . . . you may add one or more attachments to the standard model, so designed that "machine growth" is simplified and practical.

Thus, with gradual investments, you will build your Baird 4-slide to a full production unit capable of turning out the widest variety of wire and ribbon products. Here is a list of attachments easily added . . . but naturally, not all on one machine . . . as they might become too complicated.

1 Horizontal Press Attachments



2 Form Raising Attachment

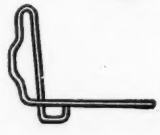
3 Pin Pulling Attachment

4 Round Wire and Ribbon Metal Rings
(Simple, practical tooling available)

5 Secondary Cut-Off Attachment

6 Pinch Pointing — Nail Pointing
(Tooling to suit work and wire specifications)

7 Vertical Forming and Stripping
(New patented Baird mechanism for this work)



Baird engineers will gladly develop tooling from your parts or specification. "Ask Baird about it!"

the BAIRD MACHINE COMPANY
STRATFORD • CONNECTICUT

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

48A52

We can learn from bankrupt Micawber

"MY advice, Copperfield, you know. Annual income twenty pounds, annual expenditure nineteen-nineteen-six, result happiness. Annual income twenty pounds, annual expenditure twenty-ought-six, result misery. The blossom is blighted, the leaf is withered—in short you are forever floored. As I am!"

This is probably the most famous financial counsel in all English literature, offered a hundred years ago by Charles Dickens' character the bankrupt Micawber to the hero David Copperfield. As advice it is just as good in 1953 as it was in 1849, and just as sound for a nation as for an individual.

In 17 of the last 20 years, Uncle Sam has followed Micawber's practice, not his advice. Our national balance sheet has been, figuratively, "annual income twenty pounds, annual expenditure twenty-ought-six". Ahead of us as a nation, if we continue this irresponsible policy, is Micawber's dire predicament, "blossom blighted, leaf withered—forever floored".

There is no sane reason why the world's richest nation should continue to live the financial life of a profligate bankrupt. It is time now to set our house in order. The program called for is simple: (1) Eliminate waste and extravagance in government spending; (2) Balance the Federal budget; (3) Control the national debt and reduce taxes.

By such positive action we can protect future happiness—and prevent misery—for ourselves, our children and our children's children.

QUALITY YOUNGSTOWN SERVICE

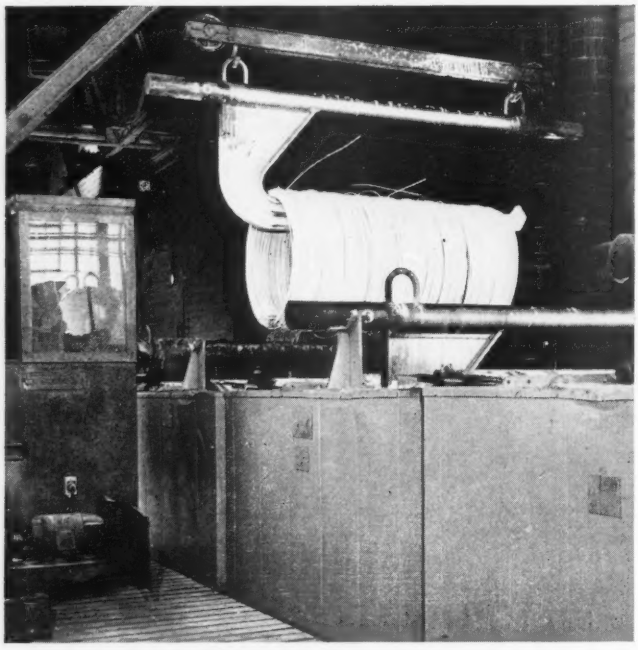
The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York

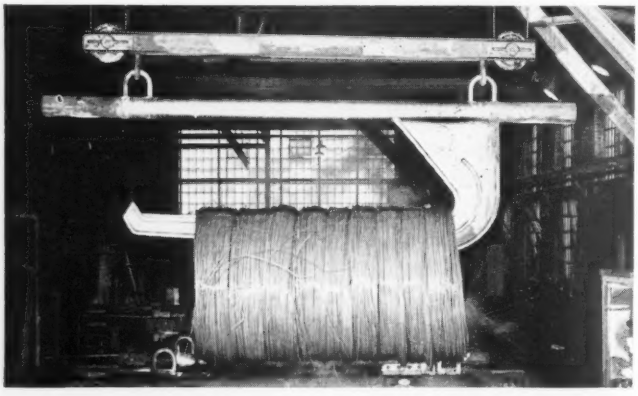
MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

RAILROAD TRACK SPIKES - CONDUIT - HOT AND COLD FINISHED CARBON AND ALLOY BARS - PIPE AND TUBULAR PRODUCTS - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RODS - SHEETS - PLATES.

For Top-Most Value in Wire and Wire Rope Today it's *Roebling..*



Weldco hook and wire, coming from the lime tank, are about to enter the baker.



A Weldco hook, carrying coiled wire, is shown emerging from hot sulphuric acid.

And WELDCO Hairpin Pickling Hooks *Help Maintain this Roebling Quality Leadership*

The John A. Roebling's Sons Company has one of the largest specialty wire mills in America. From steel-making to finished wire—throughout every operation—quality is assured by Roebling techniques and modern manufacturing facilities. In the handling of coiled wire, for instance, Roebling uses 18 Weldco pickling hooks, and each one carries 60 tons of wire per day!

Weldco hairpin pickling hooks combine light weight, toughness and high strength. Made of long-lasting, corrosion-resistant Monel, they handle payloads up to 4200 pounds, withstand sulphuric acid solutions, and outlast bulky cast hooks 2 to 3 times. These easy-to-handle hooks have outstanding service records, and offer, also, many other cost-cutting, time-saving features:

SUPERIOR DESIGN

Readily adaptable to all types of handling equipment.

Fast, easy loading and unloading of coils.

"Single-point contact" between hook and coil, provides more thorough pickling and cleaning.

Jacketed Monel spreader keeps rusty moisture from falling onto the coil . . reduces damage and rejects at the draw bench.

ECONOMICAL, EFFICIENT OPERATION

Big savings in the low, initial cost.

Long production life—years and years of heavy-duty service.

Bigger payloads—fewer "trips"—less cost per ton.

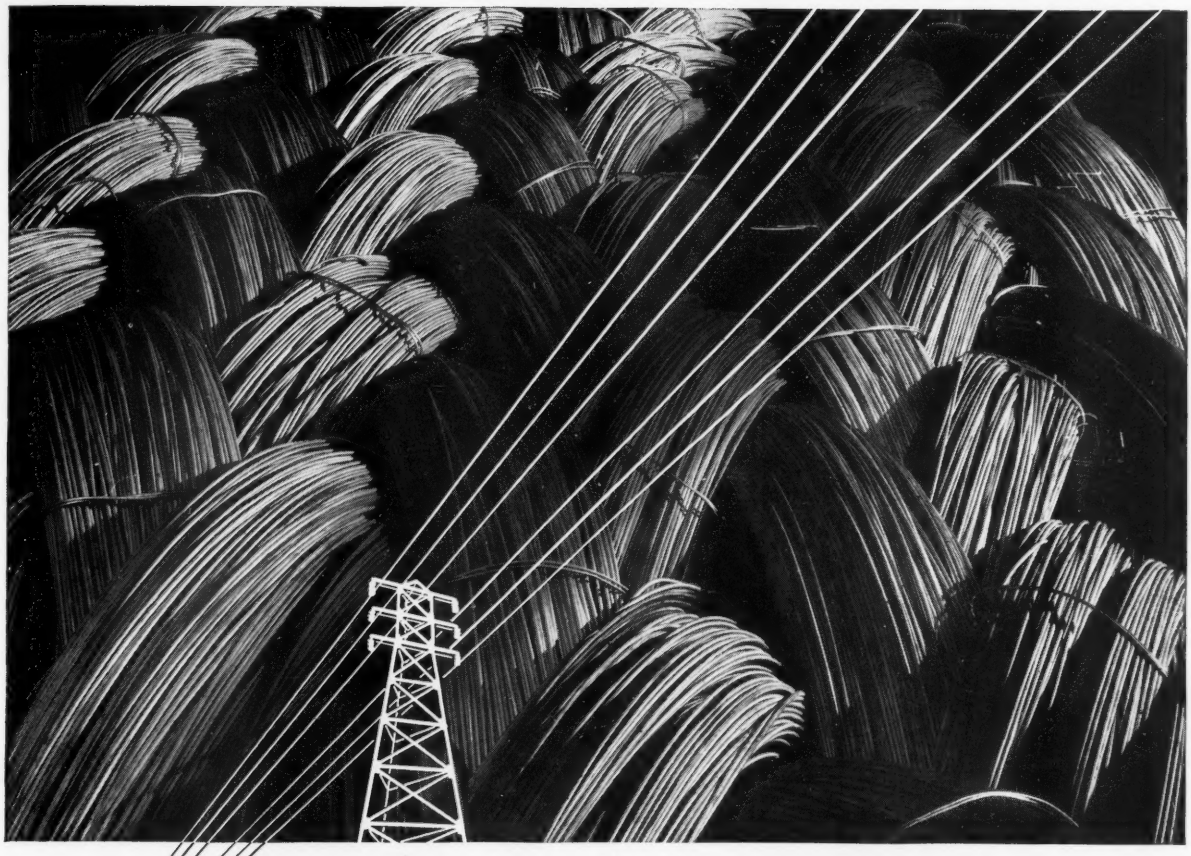
Less maintenance—fewer replacements because of the excellent resistance of rolled Monel to sulphuric acid and fumes.

No breakage, because of Weldco's unusual strength.

Leading wire mills throughout the country have discovered that Weldco lightweight hooks reduce pickling costs and improve production methods. Our Engineering Department will be glad to give you further information . . . and offers complete engineering service on your entire pickling line.

THE YOUNGSTOWN WELDING & ENGINEERING COMPANY

3706 OAKWOOD AVENUE . . YOUNGSTOWN 9, OHIO



for strong, tough ACSR cores

specify Pittsburgh Wire

Made especially for reinforcement of stranded aluminum electrical conductors, Pittsburgh A.C.S.R. Core Wire has the high-tensile strength, the toughness and the heavy uniform galvanized coating to enable you to make the best possible cable.

With this special wire, you get the benefit of the years of experience of one of the largest wire mills in the world. It has an inherent quality that stems from the selected high carbon, open-hearth steel—the uniformity of gage—and the tight adherence of coatings that will work flawlessly in your stranding and closing machines. Available in diameters 0.1878″ to 0.0525″. For information on how to order, write today to Department WWP, Pittsburgh Steel Company, Grant Building, Pittsburgh 30, Pennsylvania.

Pittsburgh Wire

a product of **Pittsburgh Steel Company**

Pittsburgh, Pa.

For the FINEST Dies...

Specify

DIES... TOOLS... WEAR PARTS... BLANKS...

TELEPHONES: FACTORY and BRANCHES

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BOSTON, MASS. DExter 2-4456	DENVER, COLO. Tabor 0444	KANSAS CITY, MO. Baltimore 1700	MOLINE, ILL. Moline 3821	PORTLAND, ORE. ATwater 9641	SCRANTON, PA. Enterprise 1-0551
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The Wire Outlook

By the time this appears in print the new Administration will be functioning in high gear and be well on the way toward cleaning up the sorry mess that is its heritage.

First efforts will be devoted to the elimination of government extravagances. The budget will be trimmed and bureau personnel is expected to be drastically reduced, all to the end of bringing about a reduction in taxes. It will be some time in the Spring before we shall be able to notice any trend, and even then the full efforts to bring about needed changes will not have been realized. A long tough job is ahead of Washington.

Most wage and price controls will be removed. The State Department and the military services are due for an overhaul, cuts and more realistic and practical policy formulations.

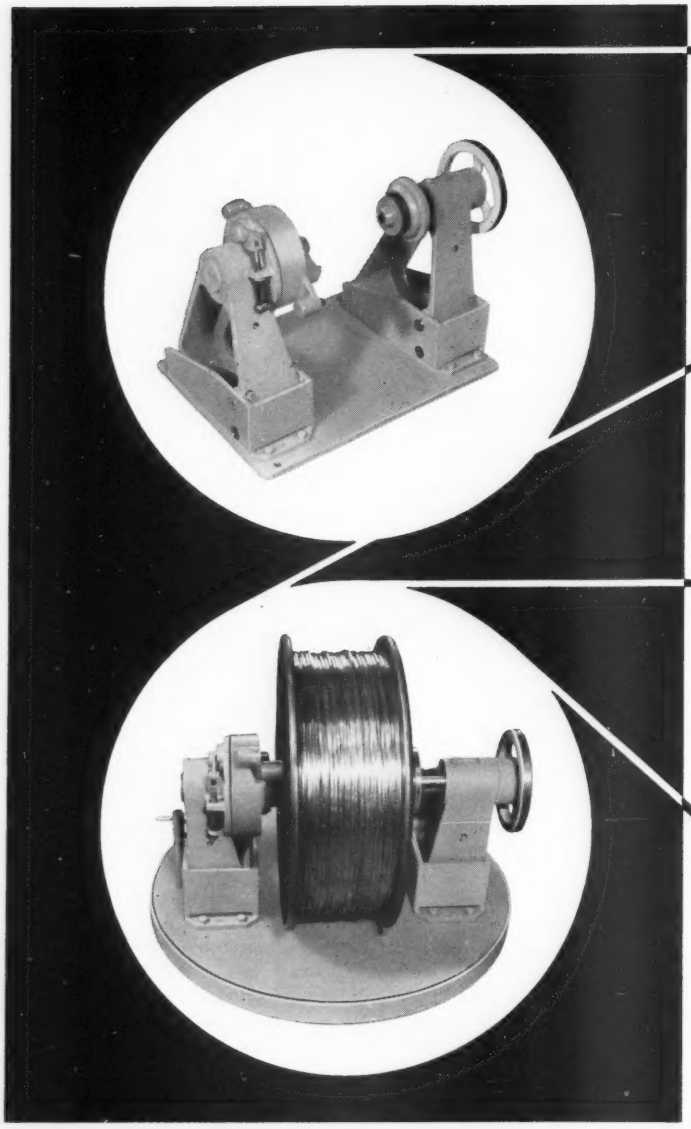
The new cabinet, widely agreed to be comprised of the best top-flight businessmen the country can offer, will replace the politicians and professors, and bring to our government for the first time in many years a point of view that should enable the country to be operated along lines that private enterprise must observe to remain solvent. Antitrust laws will be enforced, but not on the premise that business is an evil to be persecuted. Our currency will be kept sound with money management related only to problems of inflation and deflation. Initiative and ability will again find opportunities for expression and the policy of penalizing these qualities for the benefit of the inefficient and lazy will go by the board.

As long as we have the Korean problem to face, we are going to have to have continued controls on many metals. Nickel will remain a critical item. The full world output in 1952 was 10,000 tons higher than in 1951, with a total production of 157,500 tons. Aluminum, although rapidly approaching the point of adequate supply, is still short because of military needs. 1952 production totaled 939,000 tons, 19% higher than the best previous year. 1953 should see in excess of 1,000,000 tons produced. Copper, in better supply, will still be short throughout 1953. The arbitrary price ranges of from 24.5c to 36.5c is one of the bugaboos of the market. Zinc and lead have been both plentiful and scarce in 1952, but demand is expected to increase and a more stable market to result this year. Tin supply has moved upward and stocks are now fairly ample, with decontrol likely to come about in 1953. Steel, the backbone of industry, is now readily available and if present in-excess-of-capacity rates of production are maintained, should be adequate this year to meet all needs.

Wire orders are generally heavier, with some capacity for high carbon fine wire open. Heavy low carbon wire orders are keeping pace with supply. Nails and merchant products are in good supply, but buyers are keeping inventories low. Cold heading and screw wire are also in good balance with demand. Music and rope wire production has caught up with demand and are now in fair supply. Upholstery wire production is not quite meeting its demand and is in somewhat short supply. With the new impetus to automobile production, valve spring wire is under some pressure for deliveries, as well as other types of wires used in motor car manufacture.

The year has started in fine shape and with excellent prospects. Businessmen are breathing easier and beginning to feel that they can start planning for the future. Most materials will be in better supply, which will help. Most encouraging will be the feeling that our nation's destinies are now in hands that are competent and trustworthy. Our national dignity has been immeasurably increased.

—from the Editor's Desk



a fixed..

or swivel mounted..

pay-off stand

Two sizes of each type available that will handle reel sizes from 16 to 24 or 24 to 30 inches.

A slight handwheel force will lift the heaviest reel.

Friction Drag is adjustable over a wide range.

TYPE VS, FIXED BASE

Bed plate can be grounded into floor or bolted onto surface.

TYPE VSR, SWIVEL BASE

Swivel bed plate rotates on steel balls in retainer ring. Can be locked at increments of 90°.

A heavy, cast iron frame is mounted on a fixed or swivel bed plate. Ball Bearing mounted pintles for the larger reels are permanently mounted. Adaptor pintles accommodating the smaller reels are easily attached to the permanent pintles. Adjustable pintle heights provide for standard reel sizes. Light pressure on the hand wheel will lift the largest reel off the base plate on taper-edged pintles. A wide range friction drag is adjustable while the reel is turning. An automobile-type brake lining is easily replaced when worn.

Write for Catalog Section 13-H for more detailed information

See Page 193 for a complete listing of JLE Products for the Insulated and Bare Wire Industry

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WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING.

Vol. 28 FEBRUARY, 1953 No. 2

Design of an Oil Fired Galvanizing Furnace

by William D. Bawden, Works Manager

The Gilbert & Bennett Manufacturing Company

Georgetown, Connecticut

Five years ago the Gilbert & Bennett Mfg. Co. decided to revamp their galvanizing department to take advantage of the possible labor and process savings that such a change would make. Our first move was made in the galvanizing of hardware cloth and chicken netting, and, two years ago, an installation was made on a round wire unit. Due to our geographical location, we have been forced for economical reasons, to remain with oil as the source of heat application for these units and this fact must be remembered because it has influenced our pot design and furnace size. To obtain a good installation we felt it was necessary to strive for the longest pot life, a low dross production, the avoidance of hot spots, and ease of furnace operation; at the same time having an efficient furnace.

★ ★ ★

The following procedure has been used to determine the size, shape and design of our pots and furnaces:

1. **Determining the amount of work to be put through the pot.**
2. **The amount of metal required in the pan to do this job.**
3. **B.T.U.s required to heat.**
4. **The burner selection.**
5. **A comparison of the B.T.U.s required for the furnace operating idle and under full load, with the B.T.U.s furnished by the burners.**
6. **Consideration of number of B.T.U.s applied to each square foot of heating surface.**
7. **A check of the combustion area required to burn the necessary oil to heat the furnace.**

★ ★ ★

The first step in the designing of these furnaces was to decide the maximum work per hour that each furnace was expected to do. On three of our four installations, it was found that the work load varied 300 pounds per hour to 2,000 pounds per hour, and only one of the four furnaces would have a constant load. An agreement on this point is of primary importance; it must be adhered to at all times after the furnace is placed in operation if adequate pan life is to be obtained.

★ ★ ★

A great deal of literature has been written on the proper amount of zinc that should be in a galvanizing pot in relationship to the work load put through the pot. A glossary of some of these articles is acknowledged at the end of this paper. The conclusions of one theory is that a pot that holds 20 pounds of zinc per pound of production will produce less dross, have better operating conditions, with a higher production and produce a better quality product.

This paper was delivered at the Annual Convention of The Wire Association in Cleveland, Ohio, on November 12, 1952. Mr. Bawden's company has designed and built five furnaces and out of this experience has gathered much practical data that is set forth here.

The author graduated from Wesleyan University in 1929 with a B.A. degree, following which he took graduate work in Metallurgy and Management at the Lewis Institute and the Illinois Institute of Technology from 1938 through 1941. He worked as a technical apprentice in the Trenton Works of the American Steel and Wire Company from 1933 to 1936, as an inspector at Republic's Grand Crossing Works from 1936 to 1938, with the Reynolds Wire Company as General Superintendent from 1938 to 1942 when he rejoined Gilbert and Bennett as Assistant Superintendent. On October 1, 1952 he was appointed Works Manager of this company.

Wm. D. Bawden * * * * *

Figures based on 20 lbs. of molten zinc in pot for every 1 lb. of production put through the bath per hour

Production in lbs.	Cu. ft. capacity of the pot	Lbs. of zinc in the pot	Total B.t.u. at 250 B.t.u. per lb. of production	Total B.t.u. at 300 B.t.u. per lb. of production
500	23.81	10,000	125,000	150,000
1000	47.62	20,000	250,000	300,000
1500	71.43	30,000	375,000	450,000
2000	95.24	40,000	500,000	600,000
2500	119.05	50,000	625,000	750,000
3000	142.86	60,000	750,000	900,000
3500	166.67	70,000	875,000	1,050,000
4000	190.80	80,000	1,000,000	1,200,000
4500	214.29	90,000	1,125,000	1,350,000
5000	238.10	100,000	1,250,000	1,500,000
5500	261.91	110,000	1,375,000	1,650,000
6000	285.72	120,000	1,500,000	1,800,000
6500	309.53	130,000	1,625,000	1,950,000
7000	333.34	140,000	1,750,000	2,100,000
7500	357.15	150,000	1,875,000	2,250,000
8000	380.96	160,000	2,000,000	2,400,000
8500	404.77	170,000	2,125,000	2,550,000
9000	428.58	180,000	2,250,000	2,700,000
9500	452.39	190,000	2,375,000	2,850,000
10000	476.20	200,000	2,500,000	3,000,000
10500	500.01	210,000	2,625,000	3,150,000
11000	523.82	220,000	2,750,000	3,300,000
11500	547.63	230,000	2,875,000	3,450,000
12000	571.44	240,000	3,000,000	3,600,000
12500	595.25	250,000	3,125,000	3,750,000
13000	619.06	260,000	3,250,000	3,900,000
13500	642.87	270,000	3,375,000	4,050,000
14000	666.68	280,000	3,500,000	4,200,000
14500	690.49	290,000	3,625,000	4,350,000
15000	714.30	300,000	3,750,000	4,500,000
15500	738.11	310,000	3,875,000	4,650,000
16000	761.92	320,000	4,000,000	4,800,000
16500	785.73	330,000	4,125,000	4,950,000
17000	809.54	340,000	4,250,000	5,100,000
17500	833.35	350,000	4,375,000	5,250,000
18000	857.16	360,000	4,500,000	5,400,000
18500	880.97	370,000	4,625,000	5,550,000
19000	904.78	380,000	4,750,000	5,700,000
19500	928.59	390,000	4,875,000	5,850,000
20000	952.40	400,000	5,000,000	6,000,000

Figure 1

Total Heat Requirements

Production lbs. per hour	B.t.u. per hour
1	187
10	1,875
100	18,750
500	93,750
1000	187,500
2000	375,000
4000	750,000
6000	1,125,000
8000	1,500,000
10000	1,875,000
12000	2,250,000
14000	2,625,000
16000	3,000,000
18000	3,375,000
20000	3,750,000

Figure 2

We have found that this volume of zinc has some beneficial assets in the fact that the temperature changes are small and very gradual when there is a variation in the work load. With the load of 2,000 pounds per hour as the maximum load which a furnace should do, the pot should then contain 2,000 pounds times 20, or approximately 40,000 pounds of metal. We know that one cubic foot weighs 420 pounds so that our pot, to contain 40,000 pounds of metal, should have a volume of approximately 95 cubic feet.

★ ★ ★

Along with the determining of the amount of metal required for a pot, one has to consider the type of job that is being done in order to decide on the shape of the pan. We have selected a sloping-side pot with a round bottom for several reasons. It lends itself readily to the type of work we do. It is easy to dross, and it has given us more square feet of exposed heating surface. We will use our round wire installation as illustrating our reasons for determining the size of this kettle. For a man to reach the middle of the pan and apply a wipe for wire galvanizing, we determined that 24″ was close to the maximum at which he could reach and work satisfactorily. If 48 wires were placed on 1″ centers, our pan would have to be 49″ wide. Since this unit was designed primarly for 20 gauge wire, we decided that a 6-foot submersion in the zinc would be long enough to bring our material up to zinc temperature with the speed we proposed to operate. To get the wire in and out of the pan with a minimum of pull under the sinker, we settled on a ten-foot long by four-foot wide top opening. With the square foot area that this gave, it was easy to determine the depth necessary to obtain 95 cubic feet. So the pan was ordered 42″ deep with the vertical side for 12″ and then the slope which lead to a rounded bottom. Actual measurements of the pans show that we have 88.1 cubic feet or 37,000 pounds of metal in the pan of these dimensions. This cubic capacity compares favorably with data shown on Table 1 in Figure 1.

Pot Life Time in months	B.t.u. per sq. ft. heating area through pot side, per hour.
0	30,000
1	25,000
4	20,000
6	18,000
9	16,500
12	15,000
15	14,200
18	13,300
21	12,500
24	12,000
27	11,500
30	11,000
33	10,500
36	10,000
39	9,800
42	9,500
45	9,200
48	9,000
51	8,800
54	8,600
57	8,400
60	8,200
63	8,100
66	8,000
69	7,900
72	7,800

Figure 3

★ ★ ★

Theoretical figures are available for heating zinc and iron to 900 degrees. A 2,000 pound load in the pan will require 375,000 B.T.U.s per hour, to which must be added the heat loss of the exposed surface. We have 40 square feet exposed, and have considered half of it covered and half uncovered. (See Figure 2.)

★ ★ ★

Practical figures published by Imhoff show us that in maintaining a temperature of 840 degrees, we have 1,802 B.T.U. per hour loss for each square foot covered and a 4,625 B.T.U. per hour loss for each square foot uncovered.

★ ★ ★

Radiation loss is added to the B.T.U. requirement for the work load. With the result that if we consider half of the pot covered

and half uncovered we have a total of 524,880 B.T.U.s. When the pot is heated and not under load it would have a minimum or idle load of 185,000 B.T.U.s per hour if all the surface of the pot were left uncovered; or a 72,080 B.T.U. per hour load if the pot were left to idle and the surface of the zinc were covered.

★ ★ ★

For good furnace operation we must select a burner or burners that have a minimum fire rating of approximately a hundred thousand B.T.U.s per hour and a maximum rating of five hundred twenty-five thousand B.T.U.s per hour. Our burner selection gives us this range when the furnace efficiency has been taken into consideration. We know from experience that if our furnaces are sixty per cent efficient, the burners selected should have sufficient turn down as well as sufficient capacity to take this variation in operating conditions.

★ ★ ★

The next step to check is the number of square feet of exposed surface available to absorb the B.T.U.s into the pot. Our furnaces have the bottom carefully insulated for a distance of one foot. We did this to collect the dross in this area and see that no heat is applied to the sides or bottom where this dross will settle. Heating the metal through the dross will only make more dross. We insulated the top of each side for at least four inches and this gives us a heating area of 26 inches by 10 feet, 21.6 square feet of heating surface on each side, or a total of 43.2 square feet to absorb a maximum of 525,000 B.T.U.s. The pan is set in the furnace so that each end has a two-inch clearance to take care of any growth that might occur and does allow some heat to be absorbed in each end. Dividing the total of B.T.U.s absorbed by the pot, by the number of square foot area exposed, gives us the absorption of approximately 12,020 B.T.U.s per square foot per hour and according to our chart, this should give a 24-month pot life, if all other operating principles were obtained.

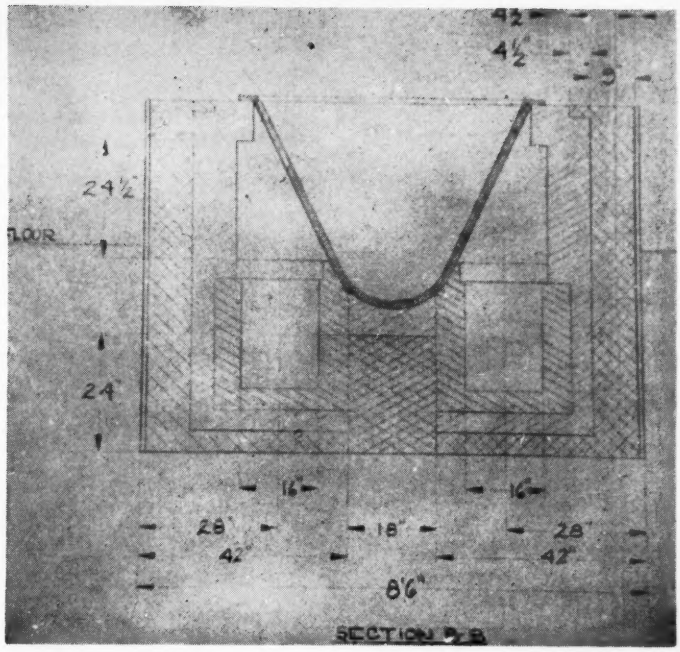

Figure 4. Cross Section of Furnace. * * * * * * * *

The problem of firing this furnace with oil and not having any flame infringement or hot spots, has been solved by the use of what we call call the firing chamber and a smaller size chamber above the firing chamber to allow the radiant heat to be absorbed into the side of the pot. In the bottom chamber we have sufficient cubic feet of air space for the proper combustion of the maximum amount of oil we need to burn. If our furnace requires 525,000 B.T.U.s at full load and we use two burners to accomplish this, then each burner would produce 267,000 B.T.U.s and burn approx-

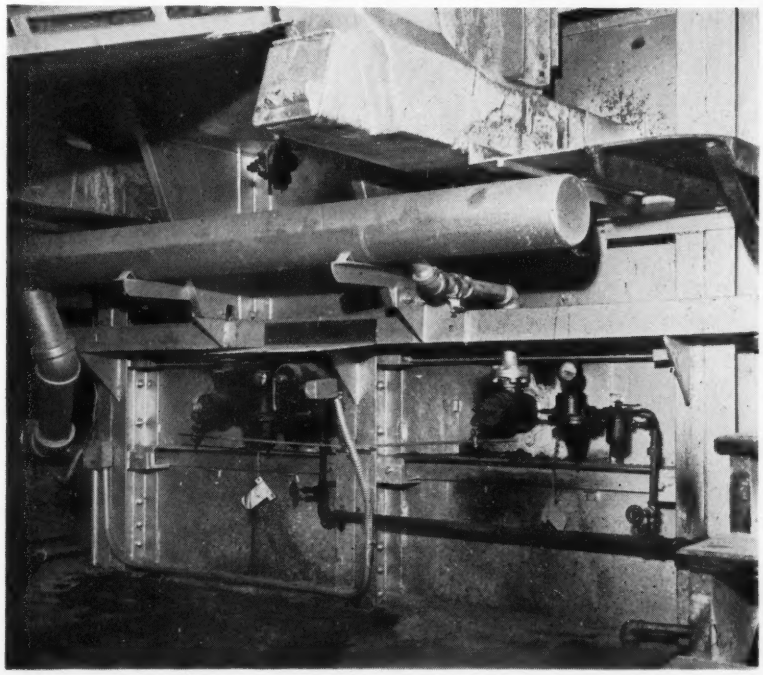

Figure 5. View Showing Burner Installation. * * * * * * * *

Figure 6. View of tank after emptying.

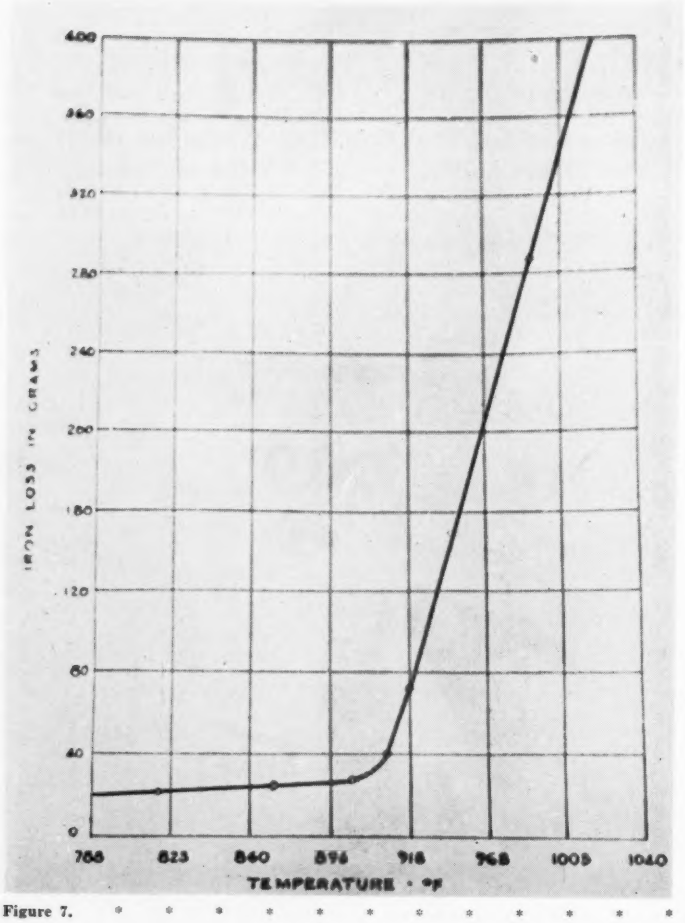

Figure 7.

imately two gallons of oil. It is common knowledge that it takes from 3 to 5 cubic feet to properly burn one gallon of number two oil; so our combustion chamber should have approximately 8 cubic feet to burn the required two gallons. A cross section sketch illustrates the methods we have used in this installation.

★ ★ ★

We have obtained a 42-month pot life but feel that it is possible to do better. This pot did not fail from any miscalculations in the design of the furnace, but failed because the material going through the furnace caused a current of zinc that washed the pot out on the exit side. Examination shows the inside of the pan to be in very good shape.

★ ★ ★

When installed in the furnace, the pan weighed 6050 and, after three and one-half years' service now weighs 5,635 pounds. A loss of 400 pounds of steel in the pot produced 6% of our dross during its life. With the elimination of this current of zinc, the pot life should be increased greatly.

★ ★ ★

Results on the problem of dross formation have been encouraging. Our records show that we produced 20.59 pounds of dross per ton of steel galvanized. Six per cent of this figure, or one and two-tenths pounds per ton has been produced from the pot itself.

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Automatic temperature control enables us to operate our pans at 840 degrees Fahrenheit throughout a week's production, even though the load on these furnaces varies from 300 pounds to 2,000 pounds per hour.

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The application of the previously mentioned considerations of furnace design has produced a very uniform heat distribution on the sides of our pot. This is evident from a visual inspection of this furnace, and from the pot life obtained.

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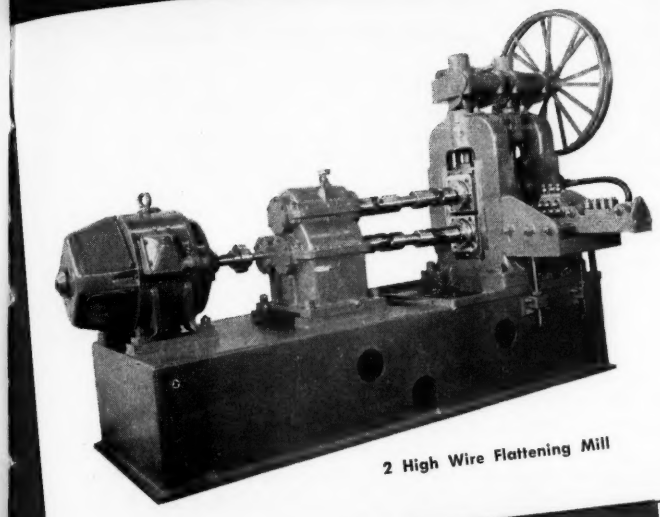
(*Please turn to page* 222)

Wean

Equipment Corporation

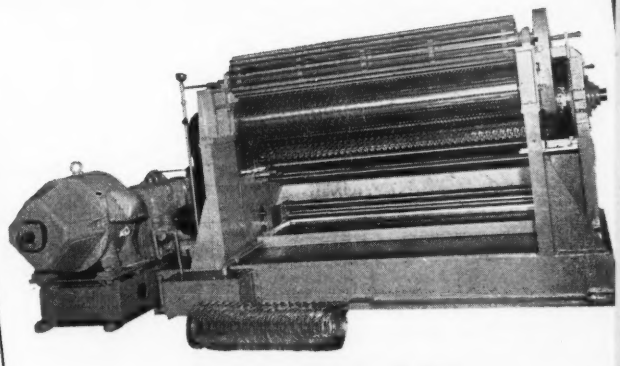
CLEVELAND, OHIO



2 High Wire Flattening Mill

Wire Galvanizing Take-Up Frame

Nail Galvanizing Unit



Hexagon Netting Machine

IN the past few years tremendous progress has been experienced in the field of wire machinery. Production speeds have been tripled and quadrupled. Product quality has been greatly improved. Machines have been made easier to operate and maintain.

THE Wean Equipment Corporation has been a large contributor to this advancement. Wean wire mill specialists have designed, built, and installed wire mill equipment for the leading wire producers the world over. If you make wire you should look to Wean for the best in machinery, service, and facilities.

Salt Versus Atmosphere Annealing

by E. S. Tyler, Metallurgist
The Atlantic Wire Company
Branford, Connecticut

This is one of a series of papers on ferrous wire processing, presented before the Annual Convention of the Wire Association in Cleveland, Ohio, on November 12, 1952. In it the author describes his company's experiences as to where each type of furnace best fits into their operations.

The purpose of this talk is to indicate the merits of both the batch type salt bath annealing and retort or bell type atmosphere annealing method as operated in the works of The Atlantic Wire Company, Branford, Connecticut. During the course of the paper by necessity some of the weaker points of both methods will also become apparent.

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We at the mill have had nearly 30 years' experience with the salt annealing method whereas our experience with the retort type equipment is somewhat shorter and involves a period of about 12 years.

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The salt annealing equipment presently in operation consists of three oil fired furnaces of our own design and construction. They each contain a welded pot of 50 inch diameter and a salt bath of about 5,000 pounds. We also have a new gas fired salt furnace designed and built by The Selas Corporation which will hold a rectangular pot with a 13,000 pound bath of salt. This furnace is to be put in operation when our new salt annealing room is ready. This change of department location is part of the present program under way to relocate much of our production equipment for better efficiency.

★ ★ ★

Lee Wilson Engineering Company, Inc. designed and constructed our retort type atmospheric annealing equipment. This consists of six 50 inch bases with three heating covers and three 62 inch bases with one heating cover. The 50 inch furnaces are of the outer fired type and the 62 inch bases of the inner heated type, that is, with radiant burner tubes within the walls of the retort. Our atmosphere generating equipment consists of two 1,000 cubic feet per hour propane burning combustors. One of these is of the exothermic type, that is, reducing atmosphere, for bright annealing low carbon materials. This atmosphere in our plant is commonly known as deox gas. The other combustor is of the monogas type from which is delivered the nitrogen atmosphere which we use in connection with material wherein decarburization must be prevented.

★ ★ ★

The product which we turn out is principally low and medium low carbon wire, although we do handle some medium and high carbon stock, also free machining screw stock and a few alloys. Our finishing sizes in rounds run from ½" diameter down to .007", on half rounds ½" and smaller, and on squares ⅜" and smaller.

★ ★ ★

I will first discuss the salt annealing method, then the retort method and finally in summary make some comparison of the methods in connection with our experience. Oil fired salt bath annealing furnaces we feel provide the user with the maximum of satisfactory annealing capacity for the amount of investment and space involved. A producer in the event of a quick change to heavier demand for process annealing capacity may build and have in production within a relatively short period a unit which will materially add to the annealing capacity. Such a furnace may be set up and operated in most any type of shed or building of sufficient height to allow for the use of a jib hoist or monorail crane. In the event of a location being temporary, this type of equipment is also readily and inexpensively moved to other parts of the plant or a permanent location as the case may be.

★ ★ ★

The greatest handicap or nuisance from this type of furnace has been the question of pot life. The change of pot being a hot, messy job and involving the loss of considerable production due to down time at such a change. The pot life depends very materially upon the oil used when operating the equipment, quality of steel from which the pot was fabricated, grade of welding done by fabricator of the pot and proper maintenance of furnace burners. It has been our experience that the life of a pot is materially increased by the bailing or removal of sludge on a weekly basis. This, too, has been a hot messy job, but it is hoped in the immediate future that it may be simplified and speeded up by the use of one of the hot salt pumps now available on the market. This should also, if successful, be of great value in bailing pots at time of burn-out as it will cut down the down time for a pot change.

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The next better setup in salt annealing is probably the gas fired unit where by the use of proper combustion and control, better pot life should be obtained due to the reduced flame impingement as compared to the oil burning type of furnace. We, in the future, will be better qualified to go into this aspect after our new Selas furnace

has been in operation for a period of time.

★ ★ ★

The best in salt annealing equipment no doubt is the electric furnace wherein the heating is done within the pot. This allows for the use of a heavy gauge pot with no retarding effect from scale as is the case with furnaces which are equipped with outer heated pots. We in the eastern section of the country cannot afford to operate this type of furnace on a low price product such as steel wire due to high power cost. It is our hope that with the gas fired furnace we may be able to obtain greatly reduced pot cost, although with somewhat higher fuel cost. We expect to arrive at a net cost per ton which will come between that of our present oil fired furnaces and the ultimate in salt equipment which is the electric furnace. The annealing salt which we use in our furnaces consists of one part by weight potassium chloride and one part soda ash, that is, sodium carbonate. The normal operating temperature which we use in our furnaces is 1250°F. The range of sizes regularly annealed in salt runs from .437″ diameter down to #16 (.0625″), although we at times go up to ½″ and down to as small as #20 (.035″). Our time cycles on regular annealing range from 20 to 50 minutes in the furnace, depending upon size and grade of material.

★ ★ ★

Wire which has been properly annealed in the above mentioned salt has a slightly etched surface which is particularly good for the development after cleaning of annealed in process heading wire finish. It is also good for general further processing through a mill as it readily carries coating and lubricant and also well lends itself to use in Liquor or Coppered Finish wires. All annealed in process material produced in our mill where the need of extreme uniformity is essential, we anneal in our salt furnaces. This does not mean where the lowest average possible physicals are involved, for in such cases the material is annealed in the retort type furnace. Free machining grades of steel wherein it is necessary to develop certain restricted physical properties or where the final finish size is such that it is necessary to anneal to work material down to finish size is best handled in salt type furnace as there is far less loss of machining quality in the steel when annealed under the short salt cycle as compared to the same material run through the retort type furnace wherein the heating cycle is much longer.

★ ★ ★

We have also been very successful for a number of years on certain types and grades of material wherein an anneal is necessary to allow for certain forming operations on finished wire and where yet some stiffness is required to do with the salt furnace what we call "hot quench" annealing. That is, pull the material from the bath and immediately quench in water. The resultant wire is a uniformly annealed yet reasonably stiff material.

★ ★ ★

The salt annealing method is of very great value in a mill of our type where many small orders are handled as it allows for very quick delivery of material where process annealing is involved. It is also a very good balance wheel in the mill in conjunction with the regular retort type furnace as it is possible in a very short time to deliver annealed material to any department of the mill requiring it, thus allowing the regular annealing furnaces to continue on straight production work.

★ ★ ★

Salt annealed steel wire in general cleans readily for either Bright or Liquor Finish work with a minimum of trouble due to poor adherence of heading or Liquor coating. It is well to remember, however, that material thus annealed cannot be readily stored for further processing unless it has been cleaned and limed or otherwise coated.

★ ★ ★

We will now pass on to the subject of the retort type atmosphere furnaces and the products which we turn out from this equipment. This type of equipment requires a definitely special building or department for it, generally speaking, and it is not something to be economically or readily transferred from one part of the mill to another. The initial investment for such equipment is high as compared to the annealing method previously discussed, and the personnel to operate such equipment, including the supervisory help, need be of generally higher type than those needed for the salt equipment.

★ ★ ★

The maintenance in a department of atmosphere type annealing equipment is much greater than is involved in the case of salt annealing as there are numerous things to be kept in perfect operating condition, both insofar as the heating equipment is concerned and also insofar as atmosphere generating equipment is concerned. The watch word in this type annealing must be that the foreman or supervisory help plus the operators must be eternally vigilant.

★ ★ ★

Our Lee Wilson equipment is used on annealing work covering our entire range of sizes from ½″ down to .007″. The material in coils from 26″, 22″ and 16″ blocks is loaded on spiders and that in 8″ coils and on metal spools is placed in stacking baskets for annealing. We, in general, do all annealing of grades which we produce at the plant both insofar as regular anneal, spheroidize or normalize are concerned in our Lee Wilson equipment. The only exceptions to this are the free machining grades of steel which are entirely confined to the salt annealing. Bright annealing of both low and medium carbon material is done in these furnaces both on uncoated and Liquor or Copper finished material.

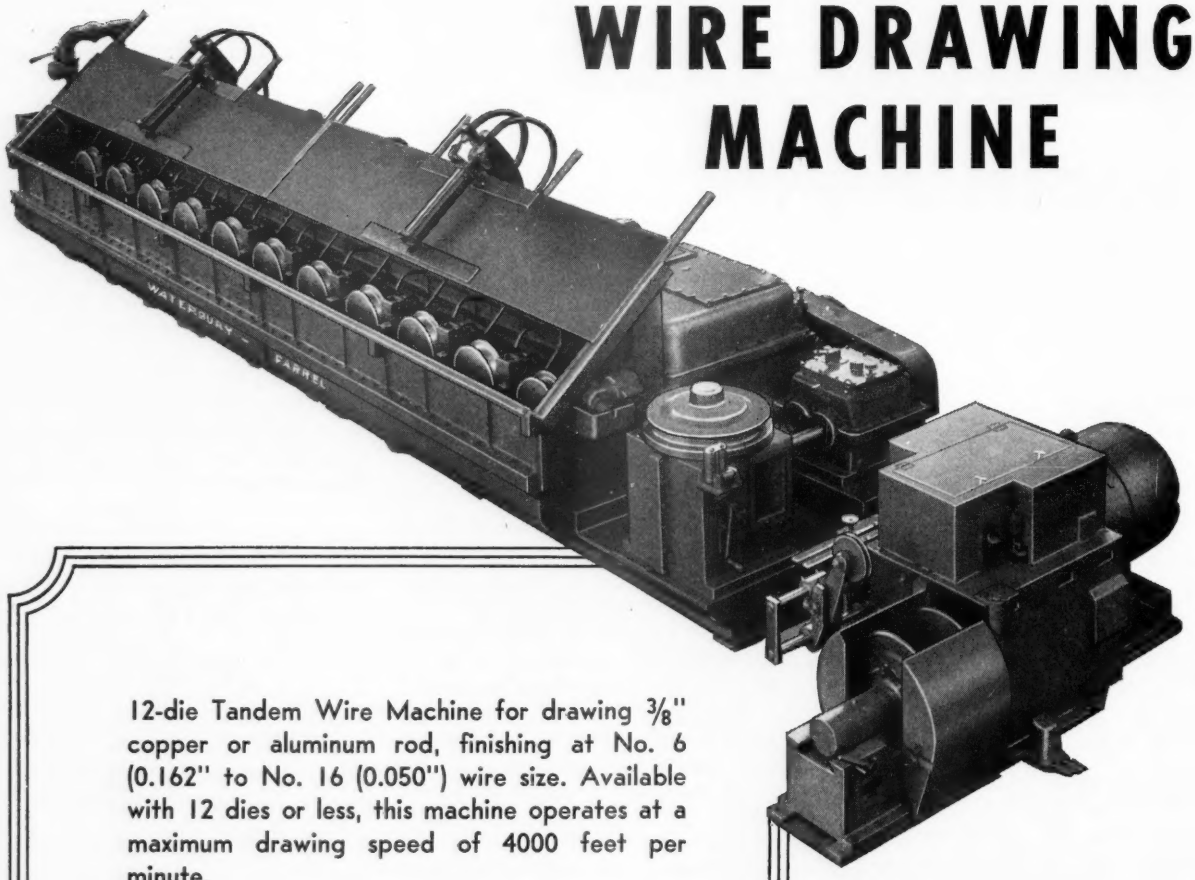
★ ★ ★

Our Lee Wilson controlled atmosphere annealing department is of very great value to us from the standpoint of the wide operating temperature range which it is possible to use in this type of equipment whereas with salt equipment each type of salt used is, in general, quite limited in temperature

(*Please turn to page* 219)

4000 FEET PER MINUTE

WITH THIS WATERBURY-FARREL 12-DIE TANDEM WIRE DRAWING MACHINE



12-die Tandem Wire Machine for drawing 3/8" copper or aluminum rod, finishing at No. 6 (0.162" to No. 16 (0.050") wire size. Available with 12 dies or less, this machine operates at a maximum drawing speed of 4000 feet per minute.

It can be furnished for drawing on spools, or coils, or as a combination machine for both as shown.

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WATERBURY FARREL FOUNDRY & MACHINE CO. • WATERBURY, CONN.

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FOUNDED WATERBURY FARREL 1851

Cutting Costs with Better Plant Layout

by D. M. Schmid, Vice President and General Manager
Alloy Metal Wire Company, Inc.
Prospect Park, Pennsylvania

In this paper delivered at The Wire Association Convention on November 12, 1952, at Cleveland, Ohio, Mr. Schmid presents numerous practical case histories illustrated with photographs, flow sheets, drawings and pictures of scale models on how to cut production costs with better plant layout. Their new multiple management teamwork is credited for all of their success in this organized cost production program.

Mr. Schmid was graduated in 1937 from Carnegie Institute of Technology. His experience includes production, engineering research and capital investment in the metal and chemical industries, the past seven years having been with the Alloy Metal Wire Company.

In line with President Eisenhower's recommendation, "Take your job seriously, but not yourself," I have a few comments about one of my chosen professions. It seems that some years ago, a rather well-known industrial engineer was addressing a Wire Association banquet, and his rather lengthy talk became most boring. Finally, one wire drawer in the back of the room who had been on a "liquid diet" threw a stainless steel water pitcher at the speaker, missing him but hitting the man next to the speaker with knock-out results. Fortunately, there was a doctor in the crowd who, upon bending over the injured man, was able to grasp his last words, "Hit me again—I can still hear him." I promise you no duplication of that performance. My talk will run under the allotted time.

★ ★ ★

One other story that you production men will enjoy, especially if you had your industrial engineer in your hair last week, is the story about the industrial engineers' convention where two young bright industrial engineers, Johnny Jones and Mary Smith, became acquainted at the Detroit convention three years ago. It seems that after a day of talking shop, their youthful spirits overwhelmed them; and before the end of the week, they were very much in love.

★ ★ ★

When the convention was held in Chicago the following year, Johnny, with typical industrial engineering efficiency, made a quick survey of the crowd to find Mary, but with no success, and he was very much disappointed. However, the following year when the convention was in Cleveland, he still hoped to see her, and again with typical industrial engineering thoroughness and efficiency, got down to the meeting bright and early in the morning and where did he find her but in the front line; and, naturally, all pleased and looking forward to a most pleasant week, he asked Mary why she did not answer his letters and why she missed the Chicago convention. Mary's explanation was that in due time after their Detroit friendship she was blessed with a baby boy. Johnny, taken by surprise, finally, loving Mary very much, said, "Mary, had you advised me, I would have gladly taken on the obligations of fatherhood." Mary's comment was, "Yes, Johnny, I feel that way about you, too; but after talking the situation over with mother, we finally concluded that it was better to have one bastard in the family than two industrial engineers."

D. M. Schmid

What Is Layout Planning?

First of all, let's admit that it is a long way from the first rough sketch you make of a better plant layout to the profit and loss statement; however, better plant layout is like a long journey—it starts with the first step—so let's be on our way and jump right into a bag full of examples. Good plant layout can quickly be defined as

Placing the right equipment
Coupled with the right method
In the right place
To permit the processing of products or units in the most effective manner
Through the shortest possible distance
And in the shortest possible time.

★ ★ ★

With rising raw material costs, substantially increased labor rates, yet little or most inadequate price relief on our own selling prices, we have no choice but to cut our costs in order to maintain earnings equal to prior years when shipments were considerably less.

★ ★ ★

You will need to have a general idea of our manufacturing operations so that you can get the most out of many cost reduction examples illustrated. We do no melt-

Figure 1. Old method unloading trucks. *

ing or hot rolling. All of manufacturing consists of cold drawing, cold rolling, annealing and pickling, along with necessary other fabricating operations to produce finished wire, rod and strip. At the end of this paper is a chart showing the three families of alloys we manufacture in the following size ranges:

Monel, Nickel, Inconel and Alray Nickel Chrome Electrical Resistance Alloys in wire and rod—½″ diameter down to .10017″.

Flat wire and special shaped wire—almost all sizes.

Strip—up to 3″ wide—thickness range .062″ to .002″.

Almet Stainless Steels—¼″ diameter down to .0017″.

Flat wire and special shapes—almost all cold rolled sizes or cold drawn sizes.

Strip—up to 1½″ wide—thicknesses .040″ down to .005″.

★ ★ ★

First, let's start with the raw material stock coming into the plant. Stock was formerly received at the south end of the plant from which we also shipped,

Figure 2. New unloading trucks. * *

and this made for a bad cross traffic jam, plus the fact that we had no suitable unloading docks where the jitney could run up into the truck and with its long fork pick up a thousand pounds of hot rolled coiled rods.

★ ★ ★

Fig. No. 1 shows the old way we used to unload trucks that required three to four men and three times as long as the new way you see illustrated in Fig. No. 2.

★ ★ ★

It is well to point out here that our heavy wire department should be down next to the stockyard location; but it was already located when we got into a serious program of plant layout study.

★ ★ ★

You can't emphasize too much the importance of your personnel to ask "WHY" in plant layout. You will find that in good plant layout, many operations can be eliminated if this question, "WHY," is used on every process. Remember, costs can be cut faster and more sharply if operations can be eliminated rather than just speeded up. You save peanuts by speeding up your operations; but you save dollars on operations that can be cut out. Entirely too many operations are studied that should never be done at all. It is even harder for the person who is intimately familiar with the operations to ask "WHY" and that is where I suggest to all of you that you listen more to your engineers, your technicians and your department heads when you are planning a relayout for some department. It is a must that the department head whose department is being relaid out study it in great detail for changes that will promote maximum efficiency . . . it is also important that other department heads study the plan, for frequently they will come up with good suggestions that someone who is intimately familiar with the operation might not discover.

★ ★ ★

For example, when we had the problem of expanding our annealing and pickling facilities, we called in all of our foremen, engineers and others connected with production to present the problem and ask for their ideas on how we should tackle this important problem. We knew that our present setup for batch annealing and pickling was not up to date and there was plenty of room for improvement with lots of opportunity to reduce material handling and cost.

★ ★ ★

This is where one of our bright,

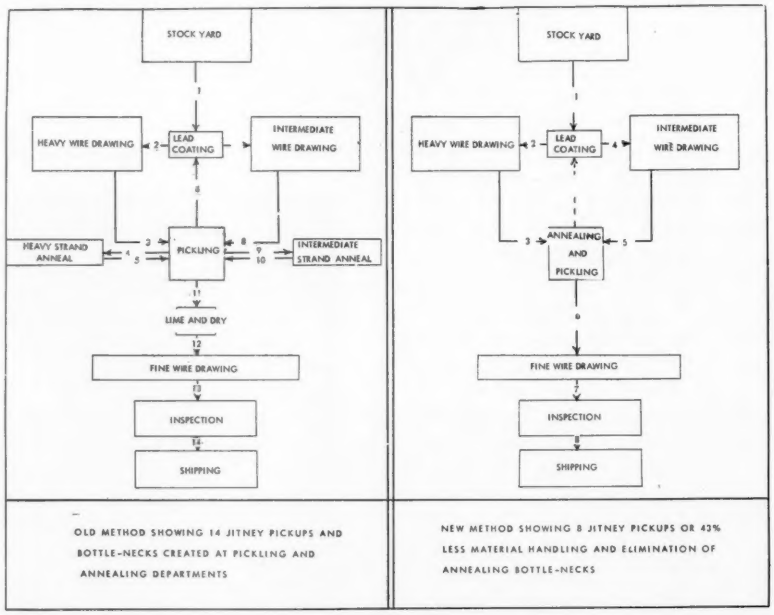

Chart 1. Flow sheet of old and new annealing, pickling and drawing. * * *

young metallurgists, who had only been with us a month, came up with the idea of putting the whole operation on an automatic conveyor so that all the operator would have to do is load and unload the conveyor. I take my hat off to this young engineer who stood alone in proposing his idea; and even more important, he had the open mindedness to change and correct his system, incorporating the many suggestions made by all of our group until the finished conveyor had little resemblance to his original idea.

★ ★ ★

This diagram shows the flow of materials between drawing, annealing and pickling and coating under the old setup. It shows very well all of the lost motion and extra handling which flagrantly violates all of the laws of good plant layout and material handling. In this operation, there are fourteen separate trips for the jitney in picking up the same coil of wire from the time it starts through his raw material to the finished fine wire shipping department. It also shows the flow sheet of our annealing and pickling, and drawing processes utilizing the new conveyor system. You will see that the jitney pickup operations have been cut from fourteen to eight, or a 43 per cent reduction in material handling costs.

★ ★ ★

Under a multiple management such as we have at Alloy Metal Wire Company, it is easier to work out such cost savings programs because our philosophy is "It is not who is right, but what is right that counts." I want to give plenty of credit at this point to our hourly paid co-workers who had plenty of good suggestions; and under our suggestion plan, they were rewarded generously in dollars for the suggestions they contributed.

★ ★ ★

For the first time, we are taking the "wraps" off our completely new conveyor system; and here you see the flow sheet of the conveyor along with how materials come in and out of our new annealing and pickling building. There are eleven stations located on 10-foot 8-inch centers, all of which rise simultaneously, advance to the next station and are lowered, all by means of an automatic timer which repeats this operation every thirty minutes or whatever time cycle the unit is set for. Annealing time required for the particular alloy being processed controls the time cycle as all other operations are flexible enough to fit the annealing time cycle. Operations performed at the various stations are:

1. **Loading 500 pounds of wire on the conveyor fixture.**

Stations No. 2, 3, and 4 are all the same and consist of 14 per cent concentration nitric acid deleading baths operating at 160° F. Approximately 1½ hour is required for removing the lead which is used as a drawing lubricant on Stainless Steels.

Station No. 4—Water washing to remove the nitric acid along with any soluble lead compounds.

Station No. 5—Flash-type baker as wire must be completely dry going into salt bath annealing furnace.

Station No. 6—Ajax salt bath annealing furnace operating 2000° F. with mixture 85 per cent barium chloride, 15 per cent sodium chloride.

Station No. 7—Salt bath water quench tank.

Station No. 8—Virgo caustic descaling bath operating at 925° F.

Station No. 10—Virgo water quench bath.

Station No. 11—Unloading.

★ ★ ★

Wire is picked up at unloading station by one of two bridge cranes operating on the same rail system, where it is pickled, water rinsed and then goes to the lime tank and to the flash-type baker where it is dried after water rinsing, and then to the lead house for lead coating, depending on the end use intended.

★ ★ ★

You can see that the conveyor line turns out 24,000 pounds of wire per day on a 24-hour basis with one operator, and the greatest of uniformity is assured by means of the automatic timing controls on the conveyor as well as on each separate station involved, which means a great improvement in quality plus lower costs. The conveyor system can either be operated on the automatic timer control or on a push-button manual operation for maximum flexibility.

★ ★ ★

These push-button controls that lighten their burden and speed up operations often remind me of the story about the country lass and the chauffeur of the rich city family who were holding a big banquet at their country home where the country lass was helping out with the serving. After the banquet, the chauffeur was to

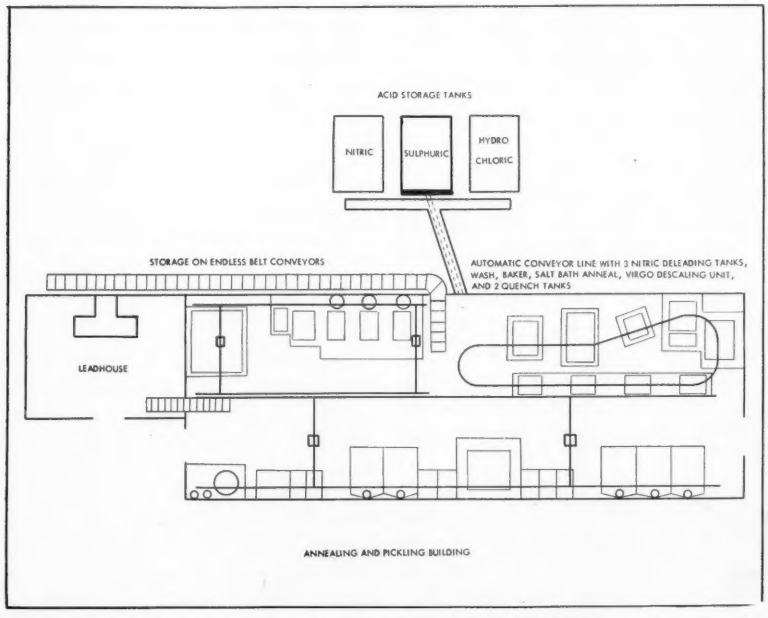
ACID STORAGE TANKS
NITRIC
SULPHURIC
HYDRO CHLORIC
STORAGE ON ENDLESS BELT CONVEYORS
AUTOMATIC CONVEYOR LINE WITH 3 NITRIC DELEADING TANKS, WASH, BAKER, SALT BATH ANNEAL, VIRGO DESCALING UNIT, AND 2 QUENCH TANKS
LEADHOUSE
ANNEALING AND PICKLING BUILDING

Chart 2. Flow sheet showing plan view of new annealing and pickling. * * *

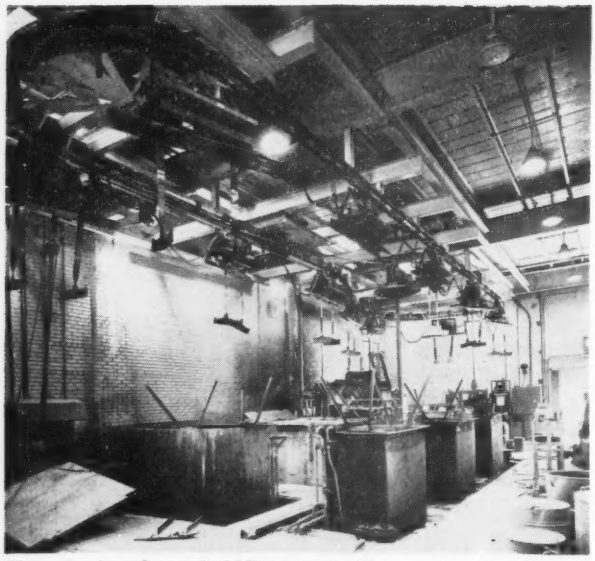

Figure 3. Annealing and pickling conveyor line. * * * *

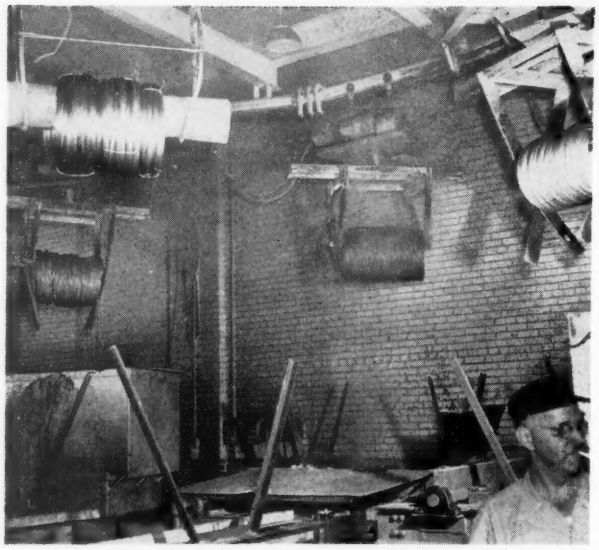

Figure 4. Another picture of annealing and pickling conveyor line.

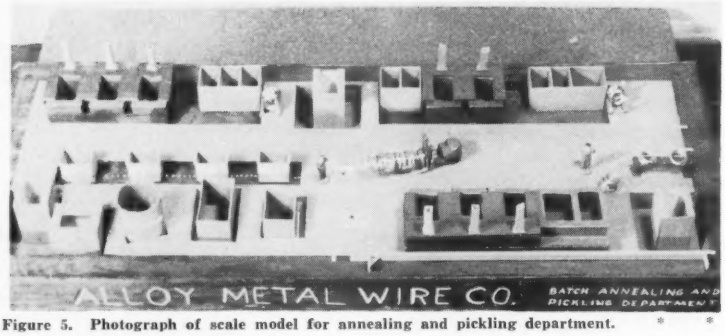

Figure 5. Photograph of scale model for annealing and pickling department. * *

take her home; and on the way from the maid's quarters through the pantry he pushed a button and the door opened automatically, and from the pantry through the outside door, he pushed another button, and when they reached the garage, he pushed another button for the overhead doors to go up, and to get into the car he pushed still another button for the door to open, and to start the car he pushed still another button. After backing out of the garage, he pushed another button and the doors closed. Upon driving down the country road, it got a little cool in the car so he pushed a button to raise the windows and pushed another button for the heater. While driving down the road still further, it started to rain and he pushed a button for the windshield wipers to function; and still a little farther down the road, as you know the windows will start to fog up in the rain, so he turned the fan on that was located underneath the dashboard to circulate the air in the car. Just about that time, they came to a sharp right-hand bend in the road where he took the bend at high speed; and with that, the country lass catapulted over into his arm and at the same time her skirts came into direct line with the floor fan, and, of course, you know the results. After the country lass was able to right herself, she looked at the chauffeur and she said, "Say, don't you city slickers do anything with your hands any more?"

★ ★ ★

You will note that the other half of the pickle house is unfinished — purposely so, because we want to work the bugs and mistakes out of the half you have just seen before we complete the other half. The unfinished half of the annealing and pickling building only involves cleaning, lime coating and drying.

★ ★ ★

Fig. No. 3 pictures the new deleading, annealing and descaling conveyor line.

★ ★ ★

Fig. No. 4 is another view of the annealing and pickling line.

★ ★ ★

Fig. No. 5 is a ¼″ scale model of new annealing and pickling building housing the conveyor line showing such details as the actual operators, powered jitney trucks and coils of wire.

★ ★ ★

With the above scale model, we could move the equipment around and all of our personnel could experiment with various layouts until we arrived at the best one.

★ ★ ★

A good example of how we can learn from our past mistakes are some 12-HF fine wire Vaughn drawing machines located here as you see on the flow. Starting sizes from .050″ to .031″ diameter are used on these machines, and finished sizes from .015″ to .005″ diameter are accomplished in thirteen dies or less. You will note these machines are so boxed in

between annealing furnaces and the wall that all raw material stock must be brought in on hand-pushed trucks and all full spools taken off the machine have to be carried some twelve feet to put into another truck that has to be pushed away by hand since there is insufficient room for power trucks.

★ ★ ★

Our expansion called for duplication of these same 12-HF machines, but we wanted to overcome our past sins; and even though we were jammed for space, we managed to lay them out as shown in the other half of the foregoing chart so that raw material stock can be delivered to machines in 2500-pound loads by power driven jitney. The coils or spools are merely taken off the machine and put in large 2500-pound capacity wire palletainers located beside the machine that are again taken away by power jitney. Actually, these machines don't take up any more room than the old machines; but they were so located and laid out in the space available that power jitneys deliver to and take away from machines, thus cutting down material handling costs.

★ ★ ★

Inspection departments in many plants are frequently not scrutinized for their actual costs; and we like many others were surprised at the lower inspection costs resulting from relayout and different methods of material handling. Here is a slide showing our old laboratory with one door through which materials had to end thus causing traffic jams and a lot of rehandling.

★ ★ ★

The next flow chart shows the new laboratory layout where materials come in one door and follow through in straight line inspection procedure and out the other door into the shipping department. You will note three inspection lines set up for the various operations. A study is now being made to see whether some rehandling can be eliminated with material actually coming out of the inspection department, in some cases, packed ready for shipment.

★ ★ ★

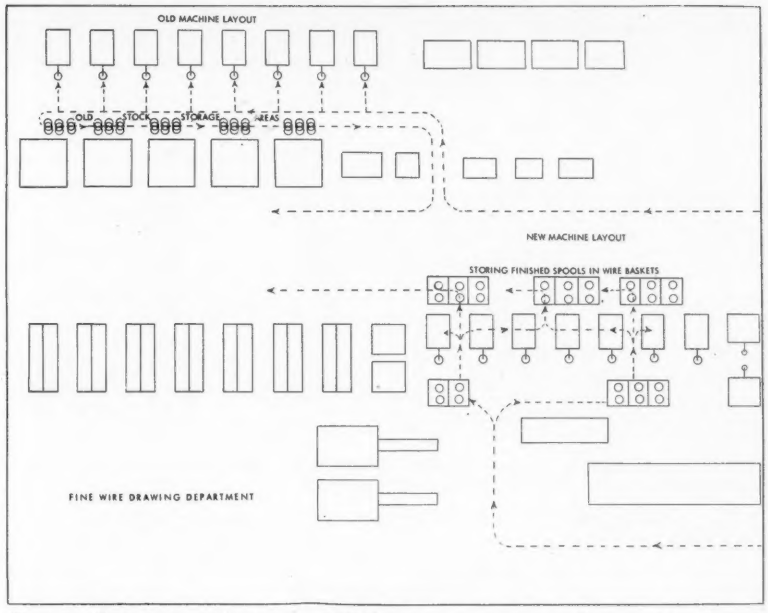
OLD MACHINE LAYOUT
OLD STOCK STORAGE AREAS
NEW MACHINE LAYOUT
STORING FINISHED SPOOLS IN WIRE BASKETS
FINE WIRE DRAWING DEPARTMENT

Chart 3. Flow sheet of old and new 12-HF Vaughn wire drawing machine. * * *

Our old over-crowded shipping department served as a receiving department also; and with only one truck loading dock, this was a serious bottleneck with trucks lining up to pick up their loads and frequently bypassing us rather than waiting, which meant that our shipping service was not the best. Here is flow sheet No. 7 showing our new shipping department where materials first come in and they are weighed on a floor level scale and a printed weight slip put with the load and the number of coils or spools noted. Work then moves to the proper packing station, that is, one station for coils, another for spools, and still another for rods.

★ ★ ★

Fig. No. 6 is a picture of a man working in our old shipping department weighing spools by taking them out of a box, placing them on the scale, and then putting them back into another box. This naturally involved a lot of

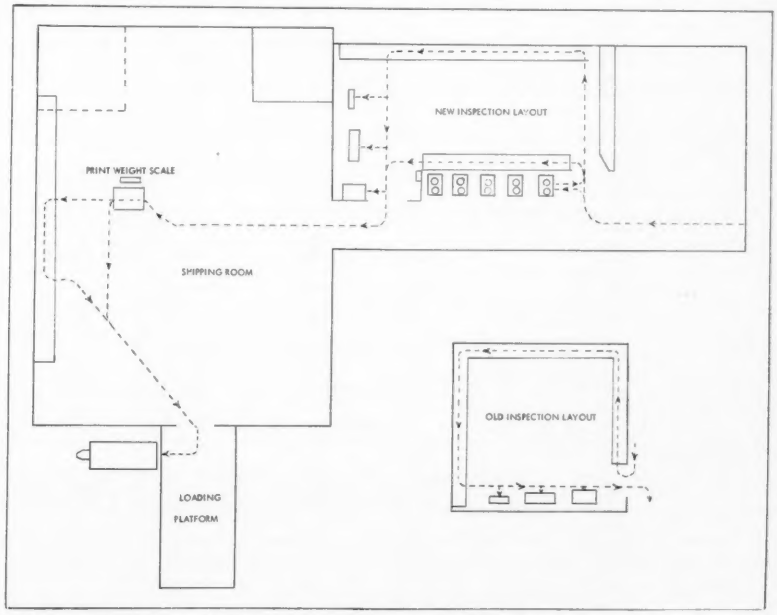

Chart 4. Flow sheet of old and new laboratory and shipping. * * * * *

GUIDE TO ALLOY METAL WIRE COMPANY PRODUCTS

ELECTRICAL RESISTANCE ALLOYS. Designed to meet the most severe conditions of temperature and oxidation, they are most widely used in electrical appliances and industrial heating equipment where long life and uninterrupted operation are of primary importance. They are produced under the latest existing patents and are maintained to standards of quality and life test as prescribed under A.S.T.M. specifications. **(Catalog D-1)**

	NOMINAL COMPOSITION					FORMS PRODUCED			
	Cr.	Ni.	Cu.	Fe	Other	Wire	Rod	Flat Wire	Strip
Alray A	20	80				+	+	√	••
Alray C	15	62		Bal.		+	+	√	••
Alray D	18	35		Bal.		+	+	√	
Excelsior		45	55			+	+	√	
Nickel—Grade A		99+				+	+	√	++
Grade D		94.5			4.5 Mn.	+	+	√	
Grade E		97.5			2.5 Mn.	+	+	√	

‡**INCO ALLOYS.** Widely used in applications where corrosion and heat resistance are of paramount importance and where special properties, such as wear, fatigue, impact and so forth combined with these properties are essential. **Catalog D-2)**

Monel		67	30			+	+	√	++
"R" Monel (Free Machining)		67	30			+	+	√	
"K" Monel		66	29		2.75 AL	+	+	√	++
"KR" Monel (Free Machining)		66	29		2.75 AL	+	+		
Nickel (Grades A, D and E)		See Above				+	+	√	++
Dura Nickel ("Z" Nickel)		94			4.5	+	+	√	++
Inconel	13	80		7		+	+	√	++

STAINLESS STEEL. An opportunity for product improvement and new design in many fields. They also have exceptional qualities in resistance to corrosion and heat. They are obtainable in a number of types and grades, differing in chemical composition, so that a selection may be made to meet the requirements of various specific applications. **(Catalog D-3)**

Almet 302	(Max. .20 Carbon)	18	8		Bal.		•	•	√	••
Almet 303	Free Machining	18	8		Bal.		•	•		
Almet 304	(Max. .08 Carbon)	18	8		Bal.		•	•	√	••
Almet 17-7PH	(Max. .09 Carbon)	17	7		Bal.	Al .75-1.25	•	•	√	
Almet 305	(Max. .12 Carbon)	18	12		Bal.		•	•	√	
Almet 308		20	10		Bal.		•	•	√	
Almet 309		25	12		Bal.		•	•	√	
Almet 310		25	20		Bal.		•	•	√	
Almet 314		25	20			2-3 Si	•	•	•	
Almet 316		18	12		Bal.	2-3 Mo.	•	•	√	
Almet 317		18	12		Bal.	3-4 Mo.	•	•	√	
Almet 330		15	35		Bal.		•	•	√	
Almet 347		18	10		Bal.	Cb.	•	•	√	
Almet C-20	(Max. .07 Carbon)	29	20	3.00Min	Bal.	Si 1.00 Mo 2.00	•	•	√	
Almet 405	(Max. .05 Carbon)	11.5-13.5				Al 10/.30	•	•	√	
Almet 410	(.12 Carbon)	12-14			Bal.		•	•	√	
Almet 416	Free Machining	12-14			Bal.		•	•	√	
Almet 420	(.35 Carbon)	12-14			Bal.		•	•	√	••
Almet 430		14-18			Bal.		•	•	√	
Almet 434		14-18			Bal.	Cu.	•	•	√	
Almet 442		21			Bal.		•	•	√	
Almet 446		25			Bal.		•	•	√	

(‡) International Nickel Co. (+) Max. Size ½" (•) Max. Size ¼" (++) Max. Width 3" (••) Max. Width 1½" (√) All Sizes

Some other Alloy Metal Wire Co. products:
36%, 42%, 49% and 52% Nickel Irons, Nickel Clad Copper.

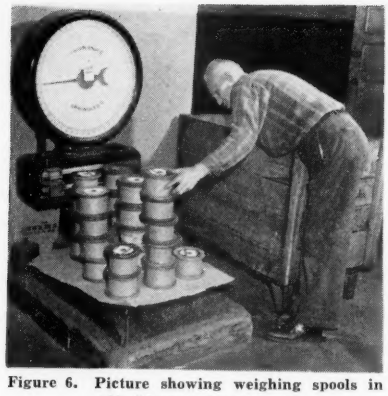

Figure 6. Picture showing weighing spools in old shipping department.

extra time and work; whereas, in Fig. No. 7 you see the new method wherein a 2500-pound load of wire on spools is brought up to the shipping department, weighed on the floor level scale as a unit, and then taken over to the proper packing station.

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In closing, I give all of the credit to cutting our production and better plant layout to my co-workers, all of whom have worked hard and long to bring about the improvements and savings you have read about. It is truly a multiple management job, and this brings up another subject that I would like to discuss at some future Wire Association meeting, providing the program committee gives me that honor; and that is "Multiple Management and How It Takes the Kinks Out of Wire Drawing."

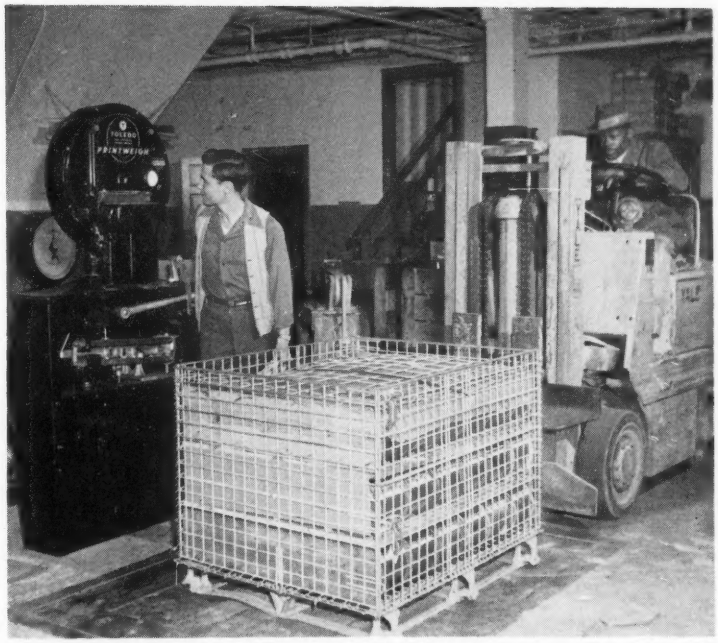

Figure 7. Picture showing 2500-pound load being weighed.

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A good slogan for industrial engineering departments is "There is no limit to what can be done if you don't care who gets the credit."

★ ★ ★

To readers of "Wire and Wire Products," you can get a copy of our new facilities bulletin that takes you on a picture trip through our plant by dropping us a note.

CALENDAR OF COMING EVENTS

April 16 and 17 — TRENTON REGIONAL MEETING at the Stacy-Trent Hotel, Trenton, N. J.

May 7 and 8 — MONTREAL REGIONAL MEETING at the Mount Royal Hotel, Montreal, Can.

June (date to be announced) — PACIFIC COAST REGIONAL MEETING, San Francisco, Cal.

Sept. (date to be announced)—NON-FERROUS DIVISION MEETING, Waterbury, Conn.

Nov. 9 - 12 — THE ANNUAL CONVENTION OF THE WIRE ASSOCIATION, with headquarters at the LaSalle Hotel, Chicago, Ill.

All of these meetings will be publicized in Wire and Wire Products and complete programs published well in advance of the meetings.

Members of The Wire Association will also be circularized by mail and hotel reservation cards, where needed, will be enclosed.

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

453 MAIN STREET STAMFORD, CONN.

Development of Electroformed Copper-Steel Wire

by A. N. Gray
Assistant Superintendent, Development Engineering
Point Breeze Works
Western Electric Company
Baltimore, Maryland

In this paper delivered on November 10, 1953, before the Annual Convention of The Wire Association in Cleveland, Ohio, the author traces the development and the functioning of the apparatus in their successful efforts to produce a satisfactory copper coated steel wire used for telephone drop wire.

One of the many products required by the Bell System for the construction and maintenance of telephone plant is drop wire. Drop wire is an item which you have probably seen and little noticed. It connects the telephone line from the pole to the residence and is installed usually in lengths averaging 200 feet. It may be surprising that this one item alone has been consumed by the Bell System at the rate of 1,600,000,000 conductor feet per year for the past five years. Obviously, in the case of an item consumed in these quantities, it is not difficult to justify extensive and even fundamental development where a promise of reduced cost or improved quality can be seen.

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Our objective in undertaking the development of electroformed drop wire conductor was dictated primarily by the desire to broaden the source of supply. Previously copper-clad steel wire was available from only a single supplier, and while the supplier never failed to come through with our requirements, we still never felt secure because of the always imminent possibility of disaster, such as floods, fires, explosions and strikes, which would render it impossible for this supplier to meet our needs. Besides that, when the proposition of manufacturing this wire by the electro-deposition process was examined, it was apparent that manufacturing economies could be effected.

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In undertaking this project, we had in hand a tandem lead-brass plating process developed in the late 30's, through which all the purchased copper-steel wire was run to prepare it for use as a conductor in drop wire. Our objective was to start with suitable steel wire core and deposit the necessary copper, then lead and then the brass in tandem in a single operation. Our first move, of course, was to investigate the various processes and electrolytes for depositing copper, and this was finally settled as a copper fluoborate electrolyte for reasons of rapidity of deposition and ductility and uniformity of deposit. Having settled on an electrolyte, the next step was to build and operate a pilot plant to clearly demonstrate that the mechanical, chemical and electrical problems could be solved and the necessary units so coordinated that a commercial unit was feasible. Having established these facts, we proceeded to design production equipment. This took the form of two 25-channel machines, designed to operate at 100 FPM wire speed, so disposed that all of the service equipment — tanks, pumps, supply stands and wire takeups—are on one level and the plating cells and tanks on a level immediately above. The wire starts from the supply stand and is accumulated and passed overhead in a vertical ribbon, then brought into a horizontal plane and pulled through a trough disposed in "C" form containing a series of immersion cells.

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Fig. 1 shows schematically the typical construction of the plating cells and contact rolls. The liquid is flowed continuously into the cell and cascades out of weir slots through which the wires pass. The cathode contact is made to driven rolls which are placed alternately with the cells. The anode contact is at the bottom of the cell. These cells and contact rolls are the same throughout the machine except they are varied as to materials of construction according to the demands of the particular solution involved.

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After completing all the processing, the wire is conducted down again to the lower level and to a group of takeup mechanisms. Once the form of the machine was firmly established, it became obvious that a building must be designed specifically to house it. This was done and the construction of the equipment was undertaken.

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Fig. 2 shows a section in evaluation of the building and machines. It should be noted that if a vertical line is drawn through the center, the two halves are identical. The wire is fed from the dual supply reels into a system of guide tubes in successive order until the entire 25 are accumulated in a vertical band with horizontal axis. This

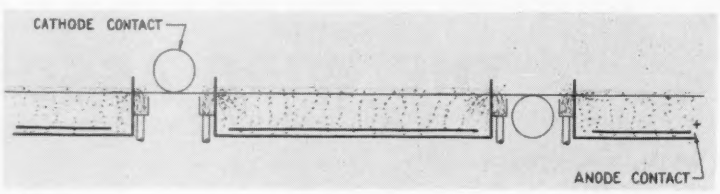

Figure 1.

band is then reoriented to a vertical axis and conducted to the second level where the entire band of 25 wires is turned to 90° to form a horizontal band with horizontal axis. Note the rectifiers disposed behind a wall which extends from the second level to the roof. All electrical controls are located in the same partially partioned area. In the center, the solution trough and cells are placed. This will be more easily understood by reference to Fig. 3.

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Fig. 3 shows a plan view of the second level where the plating operation is done. The first point of contact is a magnetized capstan which is driven by the wire and held back by an electrical brake to establish a uniform tension in all of the wires. The wires then begin their travel through the cells as illustrated in Fig. 1. This construction is repeated throughout the system in all mechanical essentials, varying only as to materials of construction to resist the particular chemicals involved. The first bath is a hot alkali for removing residual drawing compounds, dirt or oil, succeeded by steam wiper; then a system of sulfuric cells for further cleaning of scale and rust and to impart a slight etch; then since the wire is moving from an acid bath to a cyanide bath, it is air wiped, water washed and steam wiped to assure that no acid is carried to the cyanide bath. Cyanide copper is then put on to a sufficient thickness to assure that no steel wire will be exposed to the copper fluoborate solution which would cause galvanic plating if any steel wire were exposed. This assures an adherent plate. On leaving the cyanide, the wire passes through a dragout recovery unit, then water wash and steam wipe. The wire then leaves the first leg of the tank and is conducted through a 180° bend to re-enter the fluoborate bath where the copper is plated at very high current density. After passing through a single neutralizer cell to neutralize any soda ion which has clung through the washing and wiping operation, the wire passes into the fluoborate section and for the entire length of the machine, about 300 feet, it is exposed in cells as

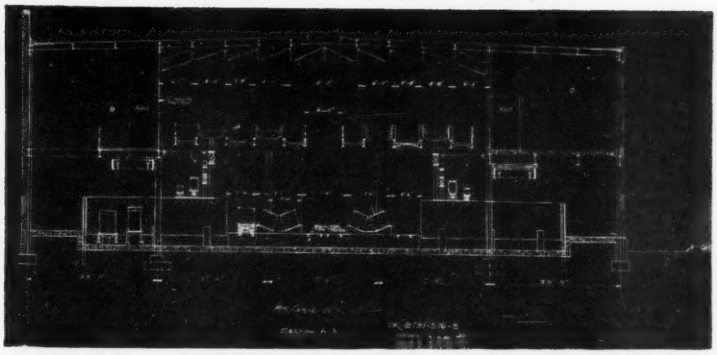

Figure 2. * * * * * * * * * * * * *

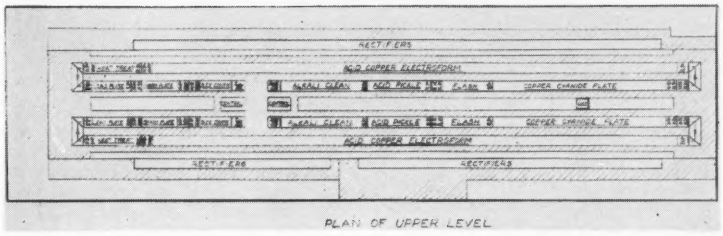

Figure 3. * * * * * * * * * * * * *

represented in Fig. 3, then to a dragout recovery unit and water wash, then to heat treatment. In the heat treatment two purposes are accomplished: (1) annealing of the copper coat for better ductility and conductivity and (2) strain relieving of the steel to obtain the elongation of 3-7%. Then it goes outside again for another 180° turn and back to an electrocleaner with hydrofluosilicic acid to remove oxides formed in the heat treatment and any dirt which might be picked up in its passage outside the tanks. The wire passes to the lead plating section with lead fluosilicate as electrolyte, then wipe, wash and wipe, and to brass, another dragout recovery and the final washing and wiping. Now the wire is complete and there remains only the task of inspecting and, incidentally, controlling the resistance. This is accomplished by a device built around a Kelvin bridge which measures continuously the resistance of a given length of any one of the 25 wires which may be chosen. A signal from this device actuates a voltage controller in the primary circuit of the rectifiers and causes them to put out more or less current, according to the signal, which, in turn, increases or decreases the rate of copper deposition and thereby produces a product within narrow limits of resis-

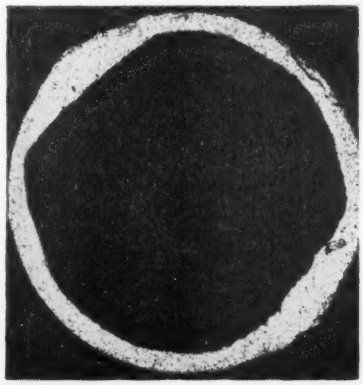

Figure 4. * * * * *

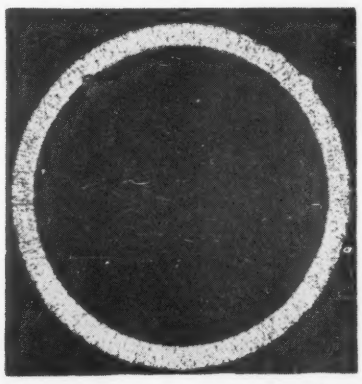

Figure 5. * * * * *

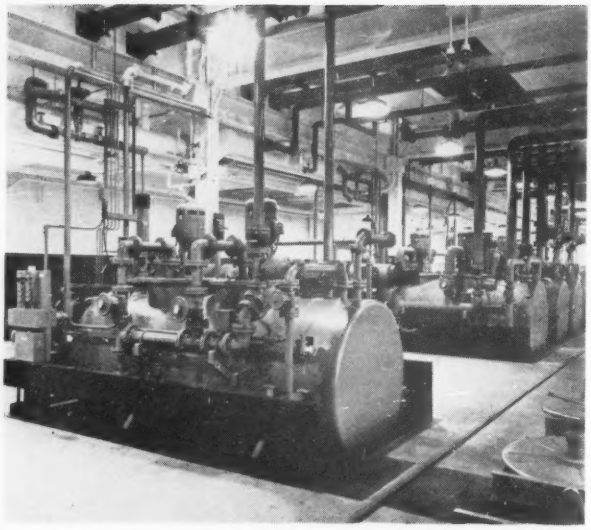

Figure 6. View of solution reservoirs. * * * * *

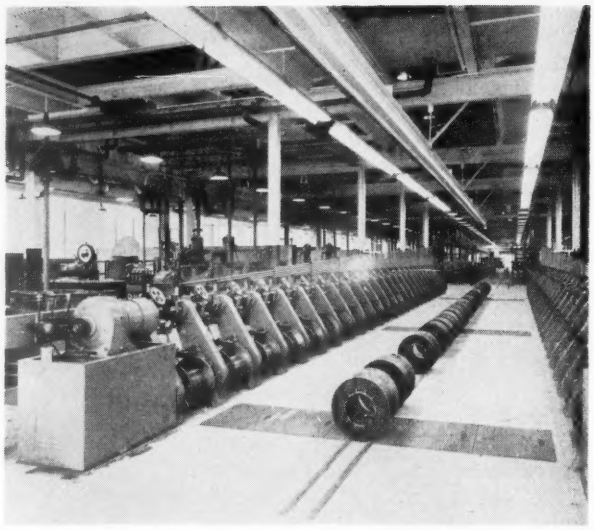

Figure 7. View of take up area. * * * * * *

tance, thus making it possible to reduce the consumption of copper to a minimum. Coupled with this device is another such measuring device which scans the wire one at a time at intervals of two minutes and indicates the variance of each with the wire which happens at the time to be the control wire.

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The average length of wire from supply reel to takeup is 850 feet. Of this, 550 feet are continuously in the electrochemical process. In the course of its passage, it is exposed to nine different chemical processes and 32 separate treatments.

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To date 900,000,000 feet, or 4 million pounds, of wire have been produced and used. The quality is reflected by these two slides and further by the comparison of breaking strength and elongation.

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Fig. 4 shows a photomicrographic section of a random sample of mechanically prepared copper-steel conductor. Note the irregular outline of the steel core and the non-uniform thickness of copper coat which is the result.

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Fig. 5 shows a similar picture of the electroformed product. As a result of the uniformity of the copper coating and the fact that no alloying has taken place, the necessary conductivity is achieved with less copper.

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Until recently the breaking strength available for the purchased wire was 170 lbs. minimum, whereas we manufacture to a breaking strength requirement of 210 to 260 lbs. The elongation of the purchased wire was 1% minimum, whereas we manufacture to a specification of 3 to 7%. The elongation may be of some interest in the light of the following example. Consider a span of 200 feet of wire between attachments, suspended 18 feet from the ground. Should a tree or other object fall on the wire, with only 1% elongation and slight shock resistance, the wire would snap and a telephone line would be out of service. If our electroformed wire is subjected to this treatment, it will stretch to the ground and remain intact. When the object is removed and the wire cinched up to its original position, the trouble is entirely cleared and no interruption to service has occurred.

(*Please turn to page* 218)

Figure 8. View of main copper deposition coils. * * * * * * *

Development of New Asbestos Insulated Magnet Wires

by Edward P. Hall, Metallurgist and Wire Engineer
Kennecott Wire and Cable Company
Phillipsdale, Rhode Island
and
Robert D. Peck, District Engineer
Johns-Manville Sales Corporation
Industrial Products Division
Boston, Massachusetts

In this paper delivered by Mr. Peck at the Annual Convention of The Wire Association in Cleveland on November 11, 1952, the application of a new asbestos product in combination with Fiberglas and Silicone varnish (for Class H. Temps.) or with Dacron yarn (for Class B. Temps.) for high temperature magnet wires are discussed.

Mr. Hall was born in Canada and graduated from McGill University in 1912, with a B.S. in Metallurgical Engineering. He worked as a metallurgist in mining, steel, and brass mills until 1918 when he went to work with American Electrical Works. This company became a part of Kennecott Wire & Cable Company, Phillipsdale, Rhode Island, where Mr. Hall is Metallurgist and Wire Engineer, and where he developed cadmium bronze wire and various other improvements in the wire field.

Mr. Peck was graduated from Massachusetts Institute of Technology in 1944, and after service with the U. S. Army, entered the employ of Johns-Manville Sales Corporation in 1948, where he is now Boston District Engineer of the Industrial Products Division of Johns-Manville.

Introduction

In speaking of new developments, it would be presumptive to imply that the insulating of magnet wire is new or that asbestos is novel as an electrical insulation. Rather, the development described herein results from combining relatively new materials in new constructions and successfully applying them so as to produce an insulation with outstanding properties of dielectric strength and heat resistance.

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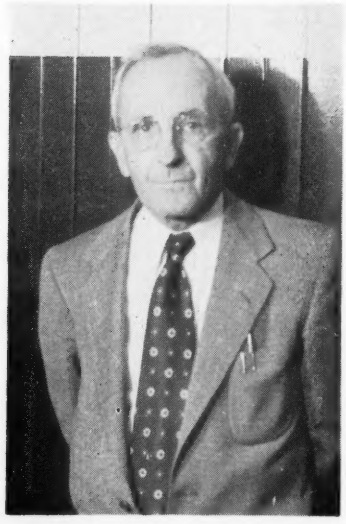
This development is the result of a cooperative program over the past three years between Kennecott Wire and Cable Company and Johns-Manville Corporation. Because the variables effecting successful production of this wire are numerous, the development has progressed in large part by trial and error, and much of the work to date is difficult to put into statistical form. Moreover, considerable work is yet necessary to realize fully the advantages and economies of these insulations.



Edward P. Hall

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From the results thus far, however, Kennecott has concluded that it is economically feasible to produce a "Quinterra-Dacron"* or "Quinterra-Mylar"* magnet wire for Class B uses and a Quinterra-Glass-Silicone wire for Class H uses and that such a wire has advantages which warrant its consideration in coil construction. Perhaps the best way of explaining this conclusion is by looking at first, the materials involved; secondly, some of the manufacturing details; thirdly, the advantages and properties which result; and lastly, the areas open for further work.

Materials

A variety of materials has been used in developing not only the Class B Quinterra-Dacron wire but the somewhat similar construction for Class H use. Some of the materials—copper wire, glass yarn, various organic varnishes, silicone varnishes, etc.—are either well known already for electrical applications or were used in such

Robert D. Peck

*—"Quinterra"—Trade Mark, Johns-Manville Corporation
—"Dacron" & "Mylar"—Trade Marks, E. I. DuPont Company

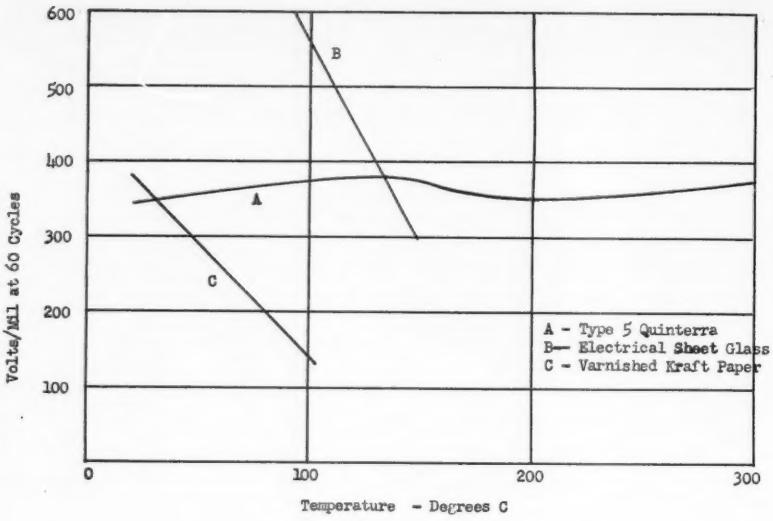

Figure 1: Dielectric Strength vs Temperature

variety that they are better considered in describing particular constructions. Two materials are of basic importance and demand some description here; these are—Quinterra and Dacron.

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"Quinterra" is the trade name of a group of unusually pure asbestos papers made by Johns-Manville and used almost exclusively as electrical insulations. It is supplied in sheets or in tapes in widths of ¼" to 36" and in thicknesses from 0.003" to 0.009". It is made on a specially designed four-cylinder paper machine with asbestos fibres which have been washed and cleaned of iron and other impurities more completely than has previously been possible with asbestos fibre. A base sheet composed of asbestos is produced, but because it has weak tensile, tearing, and bursting strengths, it is saturated with polyvinyl acetate for Class B applications (called Type 5 Quinterra) and with a silicone resin for Class H applications (called Type 3 Quinterra). Electrical properties are provided by the asbestos sheet as well as by the saturant, so that if the saturant is burned off, a homogeneous asbestos insulation remains. Such a material has several advantages, outstanding among which is maintenance of dielectric strength with increases in temperature up to 300° C—unlike most dielectrics whose dielectric values decrease with increasing temperature. In Figure 1, this property is compared graphically with glass and varnished Kraft paper. For further information, Figure 2 shows other properties of the asbestos insulation.

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"Dacron" polyester fibre is a new material developed by E. I. du Pont de Nemours & Company initially for textile applications. We understand that it is a yarn form of the same material of which "Mylar" polyester film is made. This latter is an electrical insulation sold by du Pont and having very high dielectric strengths from 4400 vpm at 0° C to 3150 vpm at 150° C according to their literature. Our use of it is based upon the tests which we describe herein.

Figure 2: Properties of Quinterra *

	Type 5	Type 3
Dielectric Strength - vpm (Min. at 20° C) -	250	250
Dielectric Strength - vpm (after 2000 hrs at 200° C) -		250
Volume Resistivity - Megamegohms - inches -	0.5	0.3
Dielectric Constant -	5.0	5.0
Power Factor at 60 cycles (approx. at 75 F, 45% RH) -	35%	25%
Magnetic Iron (max.) -	0.5%	0.5%
Elongation (approx.) -	4%	3%
Weight - lbs. per 100 sq. ft. ave. (3 mil) -	1.6	1.5
" " " " " " (4 mil) -	1.9	2.0
Breaking Strength - lbs. per in. width ave. (3 mil) -	8	5
" " " " " (4 mil) -	10	7
Bursting Strength - psi - (3 mil) -	11	9
" " " (4 mil) -	15	11

* Trade Mark - Johns-Manville Corporation

Manufacturing Details

Major difficulties in manufacturing wire with the new asbestos insulation are due to its low tensile strength and abrasion resistance. These difficulties caused two problems—the application of asbestos

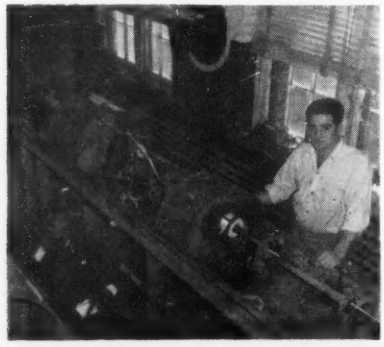

Figure 3. Wrapping machine used in making Quinterra-Dacron Magnet Wire.

to the wire, and the provision of a satisfactory covering over the asbestos.

Applying Asbestos to the Wire

The present completely asbestos insulation became available in June, 1950 and has sufficient strength and stretch to be applied almost without breaks in 3 and 4 mil thick tapes from ¼" to ⅝" wide.

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The tapes are applied from pancake rolls using a horizontal machine, as illustrated in Figure 3.

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Because of the differences between Quinterra and organic papers, many questions arose regarding its use which are of little importance with stronger materials. The relatively low tensile strength of even the saturated asbestos tapes makes them more difficult to apply than the Class A paper materials. Several adjustments are critical, including the tension on the tape, the angle of application, the pull-out speed of the machine, the lap applied to the tape. Unfortunately, it is not possible to state a specific tension, angle, etc. for all instances, as the values vary with the machine used, the particular lot of material, the thickness and width of tape, tightness of the pad on the wrapping head, smoothness of the edge of the pancake package, humidity and temperature of the wrapping room, machine speed, and other conditions. These variables, while numerous, are not prohibitive, and we have found that the operator of the wrapping machine will become, with sufficient experience, quite adapt at making adjustment of his machine so that application is easily accomplished. This "operator experience" is probably the most important single factor in successfully applying the asbestos onto the wire.

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As the result of many trials, we now feel that the best construction for this new Class B wire is made with the tapes of Type 5 Quinterra applied either in two layers of ½" x 3 mil tapes, butt jointed with 50% registration, or in one layer of a ⅜" x 4 mil tape with 16-25% lap.

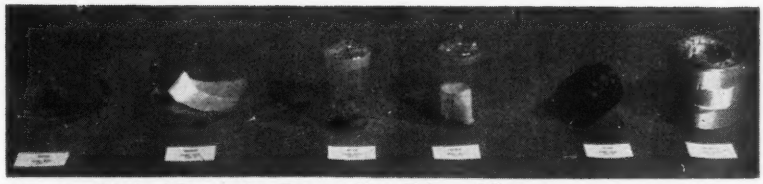

Figure 4. Effects of Temperature Exposure Upon Nylon and Dacron.
A—Nylon Cloth (Black, Charred) & Dacron Cloth (White) exposed to 150° C for 6000 hours in open atmosphere. B—Same as A in stoppered bottles. C—Nylon Yarn (Black, Charred) & Dacron Yarn (White) exposed to 150° C for over 2000 hours.

The Protective Covering

Quinterra applied to the wire does not withstand the physical abuse of being reeled and of being applied to coils, and must be protected. The protection does not need to provide electrical insulation, but should provide adequate resistance to abrasion, should be sufficiently resistant to heat to satisfy Class B requirements, and should not reduce the flexibility of the finished wire. The first material considered was another inorganic, the familiar glass yarn. It has little abrasion resistance itself, but when varnished and baked, produces an excellent surface. Unfortunately, for Class B materials, baking affects the varnish, the Quinterra, or the combination of them so as to greatly reduce the bendability of the finished wire. Many months were spent varying baking times and temperatures, and working with varnishes and saturants for Quinterra, but to date no satisfactory varnish has been found. If the varnish is insufficiently baked, the wire is tacky in the reel; if it is baked sufficiently to remove tackiness, the finished Class B wire does not seem sufficiently flexible. This has not been so true of Type 3 Quinterra and silicone varnishes.

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As a result of these difficulties, several yarns were investigated which might have satisfactory temperature stability. Nylon was first tried, then Orlon, and finally Dacron. All three yarns are excellent to apply, give a very satisfactory surface, and have more than adequate abrasion resistance. As this resistance is provided without the necessity of varnishing and baking, the flexibility of the finished wire is excellent.

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Whether Nylon or Orlon have sufficient temperature stability for a Class B wire actually was not determined, as the introduction of Dacron gave such superior temperature stability (while maintaining the other advantages of Nylon and Orlon) that it became the answer. That it provides adequate flexibility and abrasion resistance is evident in the finished wire and has been attested to by transformer manufacturers who are trying the wire. Our feelings that it will withstand the temperature requirements of Class B are best

Figure 5: Loss of Weight of Dacron Yarn Exposed to Temperature

Hours	180 C	150 C
168	.63%	.43%
336	.99%	.46%
504	1.26%	.49%
672	1.46%	.53%
840	1.57%	.56%
1008	1.69%	.60%
1176	1.75%	-
1344	1.80%	.66%
1512	1.84%	.69%
2016	1.92%	
2520	2.06%	

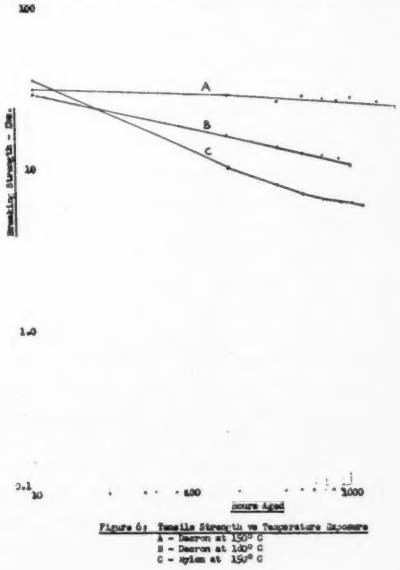

Figure 6: Tensile Strength vs Temperature Exposure
A - Dacron at 150° C
B - Dacron at 180° C
C - Nylon at 150° C

Figure 15: Dielectric Strength of Quinterra - Mylar Wire

(Dielectric Tests Made in #6 Lead Shot - Straight Samples)

Sample	No. 1 B.D. Volts	Volts/Mil	No. 2 B.D. Volts	Volts/Mil
11	2400	400 - 1280		242
2	2680	447 - 2000		377
3	2960	493 - 2400		453
4	3200	534 - 2040		385
5	2320	387 - 1920		362
6	2000	333 - 1080		204
7	2720	454 - 1640		310
8	3440	574 - 2460		465
9	2160	360 - 1240		234
10	3040	507 - 1400		264
Average		449		330

Dimensions (Ins)

	(1) *	(2) *
Overall	- .2160 x .2160	- .2145 x .2145
Quinterra & Mylar	- .0120 x .0120	- .0105 x .0105
Copper	- .2040 x .2040	- .2040 x .2040
Total Insulation	- .0120 x .0120	- .0105 x .0105
Thickness of Insulation	- .006 x .006	- .0053 x .0053

Weight/M Ft. - Lbs.

	#1	#2
Total	- 156.1	- 155.7
Quinterra & Mylar	2.5	- 1.8
Copper	153.6	- 153.9

* (1) 2 - Wraps .003 x 3/8 Quinterra Bonded to .0005 Mylar
Butt Joint - 50% Registration
Total Thickness of Mylar Quinterra - .0035"
Irvington - Sample No. 11095

* (2) 1 - Wrap - .003 x 3/8" Quinterra Bonded to .0005 Mylar, lapped 25%
Total Thickness of Mylar Quinterra .0035"
Irvington - Sample No. 11095

explained by the photographs and testing results in Figures 4, 5 and 6.

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Figure 4 is a photograph of Nylon cloth exposed for 4000 hours and Dacron cloth exposed for 6000 hours to 150° C in open dishes and in stoppered bottles. Nylon and Dacron yarns which have been at 150° C for over 2000 hours are also shown and were used to obtain data for Figures 5 and 6. Note the difference in the effect of this temperature on the two materials.

★ ★ ★

Another possibility for overcoming the poor abrasion resistance of Quinterra is through using it in combination with Mylar. Applied as an outer covering over asbestos, Mylar tapes do not appear satisfactory because they open up when the wire is bent and because they shrink when exposed to Class B temperatures. However, two companies are presently making a composite insulation from a ½-mil Mylar film between two 3-mil layers of Quinterra and from a ½-mil Mylar combined with one sheet of 3-mil Quinterra. Wire has been insulated with the sandwich material only during the past two weeks, but it appears to have excellent dielectric properties, and the abrasion resistance of the combination insulation is markedly superior to the asbestos tapes alone. Further tests will be necessary, but initial results are tabulated in Figures 15 and 16.

Advantages and Properties

Most of the testing to date on Quinterra-Dacron wire has been done to determine whether the advantages believed to be inherent in this construction actually are obtained. These advantages are: (1) having the asbestos itself function as a dielectric, (2) high dielectric strength, (3) satisfactory bendability, (4) resistance to heat degradation.

An Insulation Itself

The insulating value of the Quinterra-Dacron combination is derived from the basic insulating material itself and is thus superior to combinations of insulating varnishes and carriers. The dielectric strength of the asbestos is maintained considerably above even Class H. temperatures so that continued and positive insulating value is provided. Dielectric strength is not dependent upon the life of an organic material.

Figure 16: Bendability of Quinterra - Mylar Wire

(Dielectric Tests Made in #6 Lead Shot - Bent Samples)

Mand. Ins.	No. 1 B.D. Volts	Volts/Mil	Ave.	No. 2 B.D. Volts	Volts/Mil	Ave.
1	2800	467		1160	219	
	2960	495	449 -	960	182	191
	1720	287		920	174	
1-1/4	2320	387		1280	242	
	3240	540	449 -	1400	264	261
	2520	420		1160	219	
1-1/2	1800	300		1440	272	
	3280	547	433 -	1600	302	287
	2720	454		1520	287	
1-3/4	1800	300		1640	302	
	3280	547	422 -	1520	287	289
	2520	420		1480	279	
2	3000	500		1720	324	
	2520	420	428 -	1480	279	280
	2200	366		1360	257	
2-1/4	2200	366		1520	287	
	3400	566	462 -	1840	348	325
	2720	454		1800	340	
2-1/2	3240	540		1240	234	
	2520	420	520 -	1800	340	271
	3600	600		1280	241	
2-3/4	3480	580		1080	204	
	3440	574	573 -	1280	241	274
	3400	566		2000	377	
3	3600	600		2160	407	
	3680	614	549 -	2320	437	427
	2600	433		2320	437	

Figure 7: Dielectric Strength of Insulated Magnet Wires

(Dielectric Breakdown Tests Made in #6 Lead Shot - Straight Samples)

No.	Wire Size	Construction	Breakdown Volts Max.	Min.	Ave.*	Volts / Mil Max.	Min.	Ave.*
1	.350 x .100	Double Glass	660	400	587	101	62	90
2	.350 x .100	Double Quint. - Single Glass	3510	3240	3333	288	266	273
3	5 square	Double Glass	650	505	589	91	71	83
4	5 square	Double Quint. - Single Dacron	1800	1320	1626	218	160	197
5	5 square	Single Quint. - Single Dacron	1560	1320	1380	223	189	197
6	.250 x .100	Double Quint. - Single Dacron	2700	1500	2271	351	200	279
7	.250 x .062	Double Quint. - Single Dacron	2160	1830	2046	227	159	185
8	.400 x .100	Double Quint. - Single Dacron	1950	1530	1806	260	204	241

* NOTE: Average of Ten Samples

Figure 8: Comparison of Dielectric Strengths - .350 x .100 Wire

(Dielectric Breakdown Tests Made in #6 Lead Shot - Straight Samples)

	(1) .350 x .100 Double Glass			(2) .350 x .100 Double Quinterra - Single Glass*	
Sample	B. D. Volts	V/Mil		B. D. Volts	V/Mil
1	580	89	-	3330	273
2	630	97	-	3240	266
3	600	92	-	3300	270
4	400	62	-	3330	273
5	635	98	-	3360	275
6	660	101	-	3240	266
7	560	86	-	3390	278
8	630	97	-	3330	273
9	550	85	-	3510	288
10	625	96	-	3300	270
Ave.	587	90	-	3333	273

	Dimensions (in.)	Dimensions (in.)
Overall	.3585 x .1150	.3690 x .1260
Copper	.3475 x .0998	.3470 x .0992
Increase	.0110 x .0152	.0220 x .0268
Thickness	.0055 x .0076	.0110 x .0134
Ave. Thickness	.0065	.0122

* NOTE: 2 wraps 3/8" x 0.004" Type 5 Quinterra, 25% lap - 1 wrap glass.

Figure 9: Comparison of Dielectric Strengths - #5 Sq. Wire

(Dielectric Breakdown Tests Made in #6 Lead Shot - Straight Samples)

	(3) 5 Square - Double Glass			(4) 5 Square - Double Quint. Single Dacron *			(5) 5 Square - Single Quint. - Single Dacron **	
Sample	B.D. Volts	V/Mil		B. D. Volts	V/Mil		B. D. Volts	V/Mil
1	600	85	-	1740	211	-	1500	214
2	610	86	-	1770	215	-	1560	223
3	505	71	-	1650	200	-	1380	197
4	555	78	-	1590	193	-	1320	189
5	565	80	-	1770	215	-	1320	189
6	600	85	-	1560	189	-	1320	189
7	650	91	-	1590	193	-	1380	197
8	650	91	-	1800	218	-	1320	189
9	555	78	-	1470	178	-	1320	189
10	600	85	-	1380	160	-	1380	197
Ave.	589	83	-	1626	197	-	1380	197

* NOTE: 2 wraps 3/8" x 0.003" Type 5 Quinterra, Butt Lap - 1 wrap Dacron

** NOTE: 1 wrap 3/8" x 0.004" Type 5 Quinterra, 18% Lap, 1 wrap Dacron

Dielectric Strength

As the basic purpose of an insulation is to provide a dielectric between turns and between layers, we believe that dielectric strength is not only of prime importance itself, but that it is the best measure of bendability and heat exposure. It is necessary to provide initial dielectric strength, maintained dielectric strength over long exposure to maximum operating temperature, and minimum decrease of dielectric strength in bending.

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Tests on straight samples indicate that Quinterra-Dacron insulation provides 2 to 3 times the dielectric value of present double-glass and varnish construction. The summary of a large number of tests on a variety of wire sizes are shown in Figure 7. No. 5 square wire was tested with both double-glass varnish and with Quinterra-Dacron to compare dielectric value. The average breakdown volts are 2 to 3 times greater for the latter insulation, and this is true even when the greater buildup of the Quinterra-Dacron construction is taken into account. Figures 8 and 9 are included to illustrate the details from which the summaries in Figure 7 were obtained.

Bendability

Bendability was first tested by bending pieces of the insulated wire around various mandrel sizes, with a visual observation of copper as the basis for rejection. This method seemed inadequate, however, because of the wide variation in results, and a dielectric test upon the bent samples was used as more uniform and discerning. The results, which are listed in Figure 10, indicate the small diameters to which the Quinterra-Dacron wire can be bent and still maintain a dielectric strength in excess of the double-glass-varnish combination. Figure 11 is included to illustrate the details from which the summaries in Figure 10 were obtained.

Resistance to Heat Degradation

Asbestos is virtually unaffected by temperature exposure in excess of even Class H limits, but to determine if this were also true of the dielectric values of the insulated wire construction, tests were made at room temperature, after 1500 hours exposure to 150° C and after 1008 hours exposure to 180°

Figure 10: Bendability of Insulated Magnet Wires

(Dielectric Breakdown Tests Made in #6 Lead Shot - Bent Samples)

Volts Per Mil

			Mandrels (in.)						
No.	Wire Size	Construction	1/2	1	1½	2	2½	3	Straight Samples
1	.350 x .100	Double Glass	91	89	87	91	84	90	90
2	.350 x .100	Double Quinterra Single Glass	75	108	147	198	252	218	273
3	#5 Square	Double Glass	72	77	76	79	74	71	83
4	#5 Square	Double Quinterra Single Dacron	84	109	126	158	164	188	197
5	#5 Square	Single Quinterra Single Dacron	141	146	167	126	173	161	197
6	.250 x .100	Double Quinterra Single Dacron	111	224	239	242	233	241	279
7	.250 x .062	Double Quinterra Single Dacron	145	173	175	174	193	178	185
8	.400 x .100	Double Quinterra Single Dacron	111	160	205	220	227	240	241

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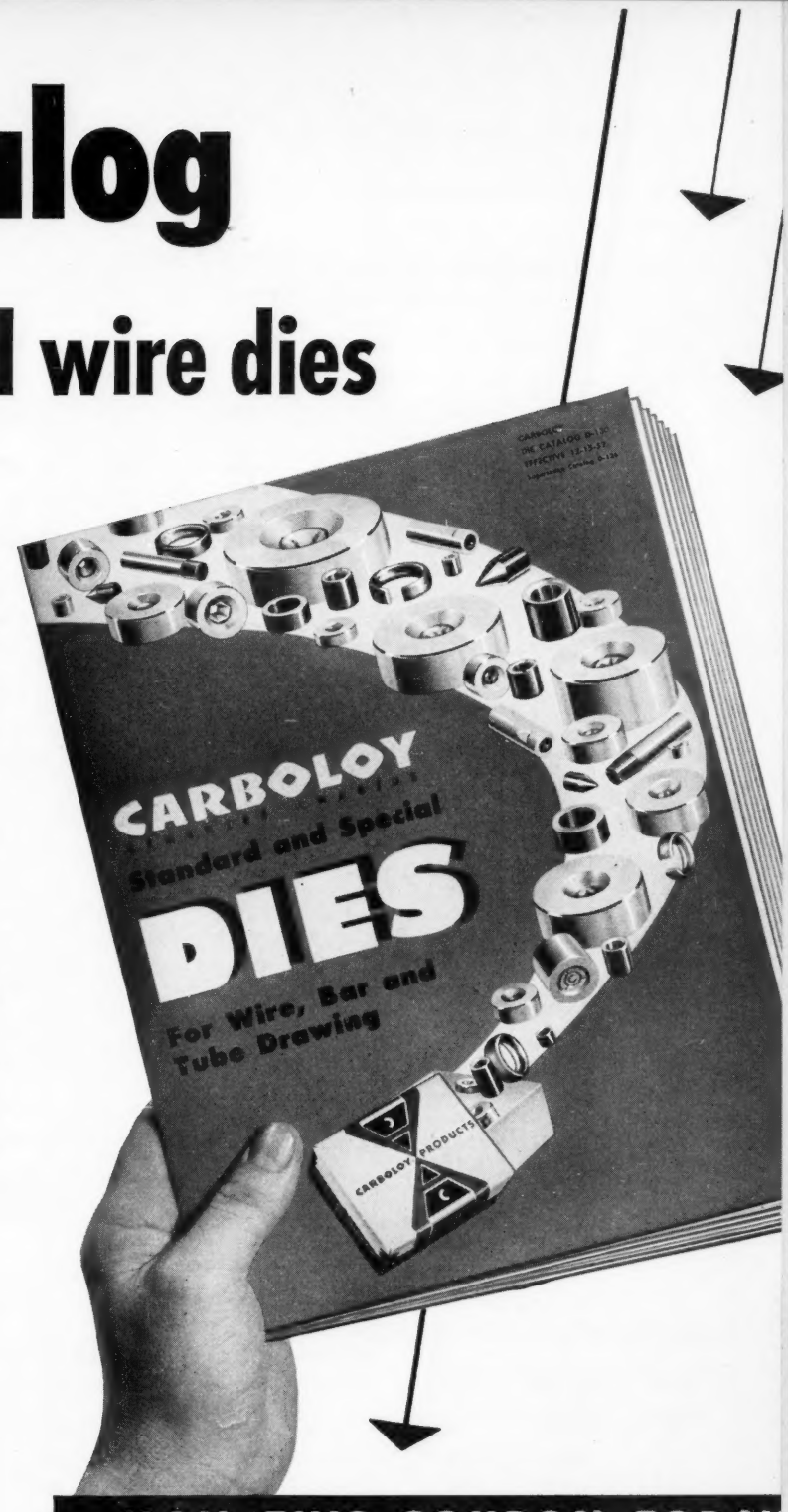

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Figure 11: Comparison of Bendability - .350 x .100 Wire

(Dielectric Breakdown Tests Made in #6 Lead Shot - Bent Samples)

	(1) .350 x .100 Double Glass			(2) .350 x .100 Double Quinterra - Single Glass		
Mand. Dia. (in)	B.D. Volts	V/Mil	Ave.	B.D. Volts	V/Mil	Ave.
1/2	575	89		1000	82	
	600	92	91	760	62	75
	595	92		1000	82	
3/4	565	87		1350	111	
	580	89	88	1300	107	95
	565	87		830	68	
1	575	89		1020	84	
	600	92	89	1920	157	108
	550	85		1020	84	
1-1/4	550	85		2130	174	
	500	77	82	1350	111	144
	550	85		1800	148	
1-1/2	520	80		2100	172	
	535	82	87	2100	172	147
	645	99		1200	98	
1-3/4	530	82		2130	174	
	600	92	83	2130	174	186
	480	74		2550	209	
2	590	91		2820	231	
	575	89	91	2160	177	198
	600	92		2250	185	
2-1/4	560	86		2130	174	
	575	89	89	2730	224	206
	600	92		2700	221	
2-1/2	500	77		3150	248	
	480	74	84	3060	251	252
	655	101		3030	248	
2-3/4	505	78		2880	236	
	595	91	88	3030	248	245
	610	94		3060	251	
3	625	96		2400	197	
	545	84	90	2760	226	213
	580	89		2820	231	
3-1/4	555	85		2670	219	
	595	91	90	3150	258	243
	620	95		3210	263	

Figure 12: Dielectric Strength After Temperature Exposure

(Dielectric Breakdown Tests Made in #6 Lead Shot)

(7) .250 x .062 Double Quinterra - Single Dacron - Straight Samples *

			Aged 1500 hrs. at 150 C		Aged 1008 hrs. at 180 C	
Sample	B.D. Volts	V/Mil	B.D.Volts	V/Mil	B.D. Volts	V/Mil
1	2100 (C)	221	2160 (C)	218	2250 (F)	195
2	2070 (F)	180	2400 (C)	253	2280 (F)	198
3	1830 (F)	159	2130 (C)	224	2340 (C)	246
4	2100 (F)	185	2160 (F)	214	2130 (C)	224
5	2070 (F)	180	2340 (F)	203	2370 (C)	250
6	2070 (F)	180	2340 (F)	203	2580 (C)	271
7	2010 (F)	175	2040 (C)	215	2340 (F)	204
8	1980 (F)	172	2580 (C)	272	2430 (C)	256
9	2160 (C)	227	2430 (F)	211	2580 (F)	224
10	2070 (F)	180	2100 (F)	182	2310 (C)	243
Ave.	2046	186	2298	220	2361	231

Dimensions (in.):

Overall	- .2770 x .0870
Dacron	- .0060 x .0070
Quinterra	- .0130 x .0160
Copper	- .2580 x .0640
Total Insulation	- .0190 x .0230
Thickness of Insulation	.0095 x .0115

NOTE:
(C) Breakdown at Corner - (F) Breakdown on Flat

* - 2 wraps 3/8" x 0.004" Type 5 Quinterra, Butt Lap - 1 wrap Dacron

C. While these tests should be more numerous and over longer periods of times, these initial results are startling because the dielectric strength of this insulation is apparently improved with such exposure to heat. Figure 12 shows the average dielectric strength, and also minimum dielectric strengths, to be greater after both exposures than before.

Other Phases of the Development

CLASS "H" WIRE: It is doubtful if Dacron will be considered a Class H material, so that to utilize new asbestos insulation for Class H applications, it is necessary to use a Type 3 Quinterra (with silicone rather than ply-vinyl-acetate saturant) and cover it with glass and a baked silicone varnish. This construction has better flexibility than Class B wire made with varnishes, which we believe is due to the use of Type 3 Quinterra rather than Type 5 and of silicone rather than organic insulating varnishes. The finished wire is not so flexible as the Quinterra-Dacron combination, and engineers will have to recognize these limitations in designing coils. The present interest, however, in constructing electrical apparatus for operation at higher and higher temperatures should lead to further consideration and utilization of this product. Indications of the dielectric strength and flexibility obtained are shown in Figures 13 and 14.

★ ★ ★

GLASS-REINFORCED QUINTERA: The most promising development for the application of Quinterra from universal-wound packages has been a material called "Glassterra"* which is made by sandwiching glass threads between two 4-mil layers of Quinterra. At present, this insulation is being used for Navy cable manufacture, but as soon as is possible, samples will be made for trial on magnet wire. The glass reinforcement not only increases tensile strength, but also seems to give greater abrasion resistance to the insulation.

*—Trade Mark, Chase & Sons, Inc., Randolph, Mass.

Figure 13: Dielectric Strength of Quinterra - Glass - Silicone Wire

(Dielectric Breakdown Tests Made in #6 Lead Shot - Straight Samples)

	.343 x .120			#7 Square	
Sample	B.D. Volts	V/Mil		B.D. Volts	V/Mil
1	2730	260	-	3240	303
2	2880	274	-	2430	227
3	2670	254	-	3270	306
4	2400	229	-	2760	258
5	3000	286	-	2580	241
6	1860	177	-	3240	303
7	2820	269	-	3330	311
8	3000	286	-	2430	227
9			-	3000	282
Average	2670	255	-	2920	273
	Dimensions (in)			Dimensions (in)	
Overall	.3635 x .1165		-	.1660 x .1660	
Glass & Varnish	.0060 x .0090		-	.0050 x .0050	
Quinterra	.0150 x .0175		-	.0160 x .0170	
Copper	.3425 x .1200		-	.1450 x .1440	
Total Insulation	.0210 x .0265		-	.0210 x .0220	
Thickness Insulation	.0105 x .0123		-	.0150 x .0110	

NOTE: 2 wraps 3/8" x 0.004" Type 3 Quinterra, 10% Lap -
1 wrap Glass - Dow Corning Silicone Varnish

Figure 14: Bendability of Quinterra - Glass - Silicone Wire

(Dielectric Breakdown Tests in #6 Lead Shot - Bent Samples)

	.343 x .120				#7 Square		
Mand. Dia. (in)	B.D. Volts	V/Mil	Ave.		B.D. Volts	V/Mil	Ave.
1/2	1210	91	79				
	800	76					
	750	71					
3/4	760	72	96				
	1410	134					
	850	81					
1	1450	138	125				
	1500	143					
	1000	95					
1-1/4	1080	103	111	-	950	89	84
	1200	114		-	880	82	
	1530	115		-	860	80	
1-1/2	1470	140	147	-	650	61	91
	1740	131		-	1100	103	
	1770	169		-	1160	108	
1-3/4	2250	225	197	-	890	83	78
	1090	130		-	900	84	
	1950	186		-	710	66	
2	2010	194	190	-	940	88	93
	2070	198		-	1060	99	
	1860	178		-	1000	93	
2-1/4					950	89	112
					1190	111	
					1440	135	
2-1/2					1090	102	122
					1500	140	
					1320	123	
2-3/4					1080	101	117
					1620	151	
					1050	98	
3					1530	143	157
					1830	171	
					1590	148	

Conclusion

The combination of a new asbestos insulation with Dacron yarn has resulted in a construction with vastly improved dielectric properties which can be maintained under prolonged exposure to higher than Class B temperatures while providing adequate mechanical properties for coil winding. The work to date has not been exhaustive, but it has indicated the desirability of this material in present Class B coils and of a construction of asbestos, glass and silicone in Class H work.

★ ★ ★

Definite possibilities exist for additional and even improved utilization of asbestos insulation on magnet wire, but the inherent advantages of this material already are available to users of such wire.

Calendar of Coming Meetings of

THE WIRE ASSOCIATION

April 16-17: Regional Meeting in Trenton, N. J., at the Stacy-Trent Hotel.

May 7-8: Regional Meeting in Montreal, Can., at the Mount Royal Hotel.

June (date to be set): Regional Meeting in San Francisco, Cal.—Sir Francis Drake Hotel.

Sept. (date to be set): Non-Ferrous Meeting in Waterbury, Conn., at the Elton Hotel.

Nov. 9-12: Annual Convention in Chicago, Ill., at the La Salle Hotel.

Programs will be published in Wire & Wire Products

THE WIRE ASSOCIATION

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Government Wire Production Information

Wire and Cable Men Ask Less Paper Work for Government Bureaus

Elimination of certain reporting requirements was recommended by the wire and cable Industry Advisory Committee at a meeting with the National Production Authority in January.

★ ★ ★

Committee members said considerable paper work and time could be spared wire and cable mill personnel if they were not required to submit analyses of their shipments on the monthly reporting from NPAF-84. They suggested, that reports on shipments of orders bearing military and atomic energy symbols be retained, and that a summary reporting provision also be kept.

★ ★ ★

NPA officials took the suggestion under consideration, and said action will be taken on the proposal whenever it seems feasible.

★ ★ ★

The advisory group reiterated approval of a task group recommendation on removal of control over copper. NPA officials said this action has been, and remains, a matter of study and pointed out that demand for copper still is greater than foreseeable supply and probably will remain so for the remainder of 1953.

★ ★ ★

NPA said domestic copper production normally is about 80,000 tons per month. Foreign supply has been available in an unusual volume. In December 60,000 tons of copper in all forms were imported and there are indications that this movement is continuing in the current month. February imports may reach 55,000 tons.

Revisions in List Prices and Discounts

The Office of Price Stabilization has amended its regulation covering manufacturers of machinery and related manufactured goods to permit these manufacturers to apply for approval of changes in their list prices and discounts when such changes do not increase the general level of ceiling prices.

★ ★ ★

This action is covered by Amendment 44 to Ceiling Price Regulation 30, effective January 12, 1953.

★ ★ ★

A survey by OPS indicates that in some cases list prices and discounts of some manufacturers have become unbalanced since the pre-Korea base period, due to changes in costs and competitive marketing conditions.

★ ★ ★

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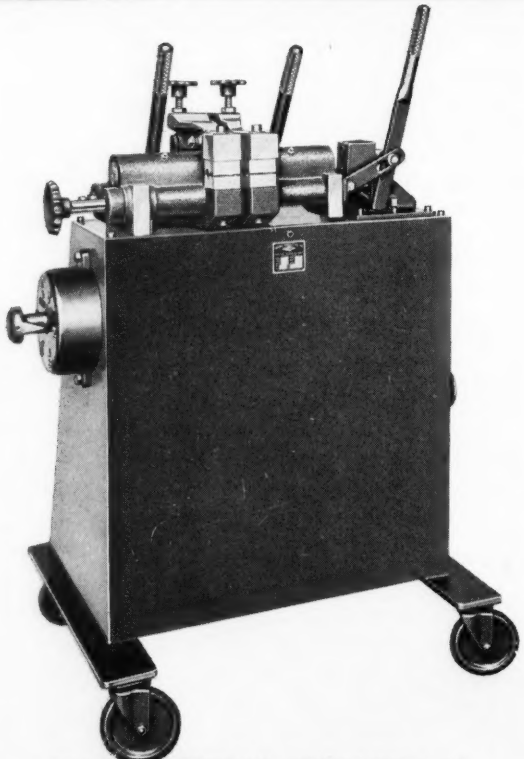

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20 NO. WACKER DR., CHICAGO 6, ILL.
Telephone: STATE 2-7468

In these cases, manufacturers may apply to OPS and propose changes in their list prices and discounts, subject to specific approval by OPS.

★ ★ ★

Applicants must show present and proposed list prices and discounts, and be able to demonstrate that had the proposed changes been in effect during their last accounting period, their sales revenue would not have been any greater.

★ ★ ★

Applications must be filed with the Industrial Materials and Manufactured Goods Division, OPS, Washington 25, D. C.

Capehart Adjustments by Machinery Manufacturers

The Office of Price Stabilization has provided machinery manufacturers with a method for computing an average "overhead cost adjustment factor" which can be used in connection with the calculation of so-called Capehart price increases. It can be used for a product line, category, or an entire business. The method can be used by manufacturers who produce standard type commodities and formula-priced commodities in the same product line or category.

★ ★ ★

This action is covered by Amendment 4 to Supplementary Regulation 4 under Ceiling Price Regulation 30, effective January 12, 1953.

★ ★ ★

On October 2, 1952, OPS issued SR 8 to CPR 30 which provides methods of calculating increases under the Capehart amendment to the Defense Production Act to meet the special needs of machinery manufacturers turning out custom designed and fabricated commodities. At that time it was stated that OPS would issue an amendment to SR 4 which would provide a method for computing an average overhead cost adjustment factor in those cases in which the formula-priced commodity is in the same product line or category as stock items.

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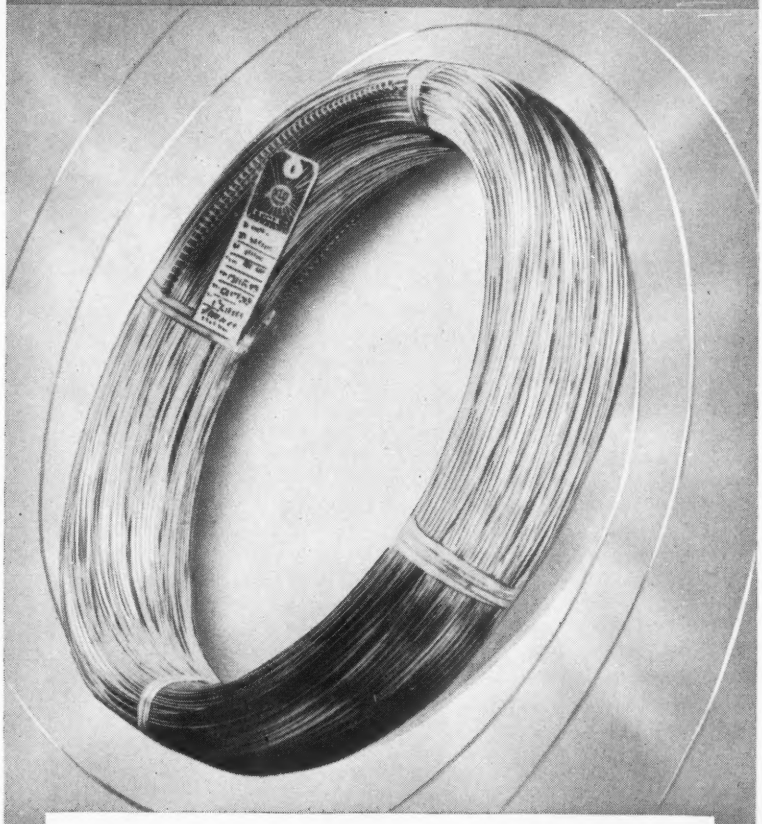

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And that, to a considerable extent, is true of the wire business. The day when any wire would do has long since passed—and that is one of the reasons why JOHNSON MUSIC WIRE is made in more than 200 sizes, all the way from 8.3 feet to over seven miles to the pound. And every order is routed for the fastest possible special delivery.

JOHNSON STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.
New York Philadelphia Cleveland Detroit Akron Chicago
Atlanta Houston Tulsa Los Angeles Toronto

SUBSIDIARY OF PITTSBURGH STEEL COMPANY

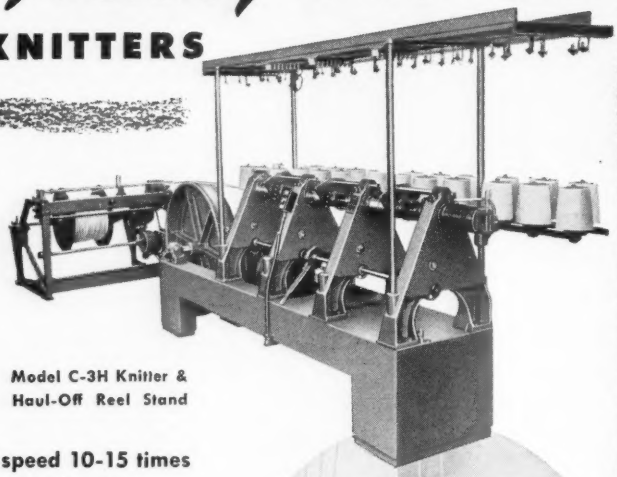
Cover non-metallic sheathed cable, building wire and weatherproof wire

1800 feet an hour

with

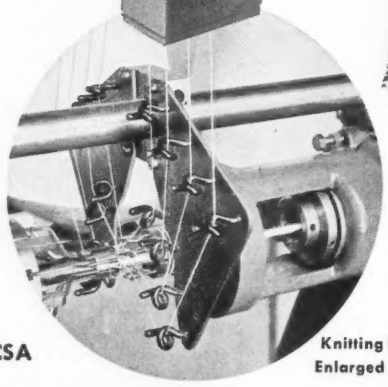
Fidelity **SINFRA**

KNITTERS



Model C-3H Knitter & Haul-Off Reel Stand

- ★ Increase speed 10-15 times
- ★ Save on cost of yarn
- ★ Boost labor output 600%
- ★ Eliminate yarn rewinding
- ★ Conserve floor space
- ★ Cut maintenance costs
- ★ Reduce power requirements
- ★ Minimize operating noise
- ★ Improve working conditions
- ★ Provides automatic control
- ★ Lower your capital investment
- ★ Approved by UL, ASA, AAR, CSA



Knitting Head Enlarged View

This *Fidelity Sinfra* Wire Covering Machine offers you high production speed and low operating cost. The output of *one* Knitter equals 15 conventional machines. Savings in yarn costs and direct labor alone pay for this new equipment in 12 to 24 months. Knit products are universally used and meet all standards.

The modern Fidelity Sinfra method uses fewer yarns and large 3 pound cones located on a stationary creel. High-speed, rotating Knitting Heads cover the wire at 30 or more feet per minute. Design permits horizontal operation at convenient working level with no crawling or stretching. Automatic electric stop motions and other advanced features cut maintenance and down time.

To see why top companies choose Fidelity, read our literature proving its advantages. Write today for Catalog W.

Manufacturers of intricate precision machinery since 1911

FIDELITY MACHINE COMPANY INC.

3908 FRANKFORD AVE. • PHILADELPHIA 24, PA.

The amendment to SR 4 spells out three methods which may be used to determine an average overhead cost adjustment factor. The first method can be used for groups of commodities whose prices have moved uniformly between the first six months of 1950 and the first six months of 1951. The second method permits determination of an overhead cost adjustment factor for an entire business. The third method provides for determination of an "average 1951-1950 overhead period price ratio" for a product line, category, or unit, or for an entire business.

★ ★ ★

Simultaneously, Amendment 3 to SR 8, CPR 30, has been issued, which will give manufacturers the option of using either SR 4 or SR 8 to determine a Capehart adjustment for formula-priced commodities.

Super Coaxial Cable to Double Phone Capacity

Development of a super coaxial cable for television and long distance telephone use was announced recently by **Bell Telephone Laboratories.** It will have more than double the capacity of the present type.

★ ★ ★

The new coaxial cable system, prosiacally labeled an "L-3 carrier," is expected to go into actual service on American Telephone & Telegraph Co. circuits between New York and Philadelphia early in 1953.

★ ★ ★

Most coaxial cables now in use in AT&T's Bell system consist of of four pairs of finger-size tubes, each containing a wire about the size of a pencil lead. Each pair of tubes will carry 600 telephone conversations or two television programs—one in each direction.

★ ★ ★

In the new coaxial cable, a single pair of tubes will carry 1800 telephone conversations—or 600 telephone conversations plus a TV program in each direction.

★ ★ ★

Coaxial cable is one of two transmission methods used for network television, the other being microwave radio relay towers. About two-thirds of present TV network channels are on microwave beams relayed between towers averaging 25 miles apart.

E. T. Brown Named Head of Bolt, Nut, Rivet Unit of Production Authority

The appointment of **E. T. Brown,** of Beaver, Pa., as chief of the bolt, nut, and solid rivet section, general components division, of the National Production Authority, effective January 9th, was announced on January 8th.

★ ★ ★

Mr. Brown is manager of jobber sales of the Townsend Company, New Brighton, Pa., a leading manufacturer of rivets, special nails, fasteners, locknuts, cold-headed parts and formed wire products. Since September 1952, he has been assigned to the NPA as an industry representative where he has been chief of the scheduling and expediting section of the general components division. In his new capacity he will have the principal responsibility for allocating raw materials to bolt, nut, and rivet manufacturers under the Controlled Materials Plan.

★ ★ ★

He has been connected with the fastener business for 29 years, 24 of which have been in the Townsend sales department. Prior to becoming manager of jobber sales, he was Eastern division sales manager with headquarters in Philadelphia.

Patronizing Our Advertisers

These are the progressive concerns who stand behind their products and have reputations worth sustaining and you can depend upon them.

The above macrograph offers visual proof of the uniform grain flow characteristics in a carriage bolt made from Keystone "Special Processed" Cold Heading Wire. The continuous, strength-giving flow lines are a sure sign of efficient cold heading which results in longer die life, increased production and a better finished product.

The following analysis of "special processed" wire is recommended for difficult cold heading:

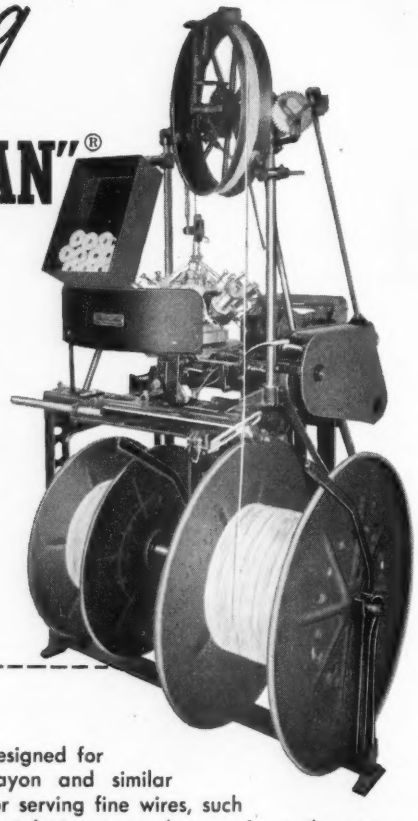
C1006 - C1012 for Clutch Heads
C1006 - C1022 for Phillips Heads
C1108 - C1109 for Phillips Head Wood Screws
C1035 - C1038 for Heat Treated Screws and Bolts

Keystone is prepared to help solve any of your industrial wire problems. Your inquiry is welcomed.

Keystone Steel & Wire Company
PEORIA 7, ILLINOIS

Introducing

THE "WARDWELLIAN"® MULTI-SERVER



Another in the series of servers developed by Wardwell. This machine is designed for applying multiple ends of glass, rayon and similar yarns on electrical conductors; also for serving fine wires, such as used in the manufacture of small coaxial wires or conductors of a similar nature.

Operating Features

- Serving head is equipped with eight carriers, each provided with its own tension system, thereby assuring uniform tension in delivering from all packages of yarn or other material being served.
- Equipped with adjustable traverse, supply and windup stands, windup driving mechanism, and electric stop-motion.
- "Reeves" variable speed unit provides for quick adjustment when change of lay is required.
- Production dependent upon requirements and type of material used.
- Maximum production when serving wire: 22.6 ft. per minute. Maximum production when serving glass or rayon yarn: 36 ft. per minute.
- Serving head speed 250 RPM for wire, 400 RPM for glass or rayon yarn.
- Driving pulley 8" diameter, 1¾" belt. Speed 222 RPM for wire, 355 RPM for yarn.
- Ratio of serving head speed to pulley speed 1⅛ to 1.
- Capstan 18" diameter, 3" face.
- Opening through serving head ⅝" diameter.
- Supply yarn package Universal wound, 2 1/16" diameter, 4" traverse, on tubes 4¼" long with ⅜" hole. Supply spool for wire 2⅝" diameter, 3¼" traverse (overall), with .640"-.656" hole.
- Maximum power requirement ¾ H.P. including power transmission.
- Motor drive furnished upon request.
- Counter for measuring in feet furnished with machine.
- Stands can be furnished to accommodate reels 30" in diameter with overall widths up to 16".
- Special windup driving parts required for reels with drums under 12" diameter.
- Reels not included with machine.
- Weight approximately 684 lbs.
- Weight crated for domestic shipment approximately 800 lbs.

Note: Serving head normally runs clockwise, but can be arranged to run counter-clockwise upon request.

REPRESENTATIVES
FOR EUROPE, BRITISH COLONIES
AND DEPENDENCIES
JAMES MACKIE & SONS, LTD.
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CENTRAL FALLS, RHODE ISLAND, U.S.A.

Competition from Abroad on Cable Likely to Increase

American manufacturers of electrical cable will meet some stiff competition from European companies in that field as soon as defense needs in Europe are filled, according to **Mr. R. A. Schatzel,** vice president and director of engineering of the **Rome Cable Corporation,** who just returned from an extensive trip abroad.

★ ★ ★

With the help of aid from the United States, given through ECA and MSA, cable manufacturers in France especially have made "tremendous strides" in technology, have rebuilt and modernized their factories, and are using production methods as modern as those in this country, Mr. Schatzel said.

★ ★ ★

A French plant recently completed a special oil-filled, 380,000-volt cable—highest voltage cable in the world—for Sweden, he pointed out.

★ ★ ★

"I saw American wire drawing machines of the very latest design in two French factories," Mr. Schatzel related. "And their own equipment, made in that country, is fully equal to anything we have in the United States."

★ ★ ★

Those plants are now kept busy by defense orders, but as soon as the defense needs are filled the French manufacturers will have to seek markets elsewhere, in order to keep their factories running, he commented. That means that they will be trying to sell their products in South America where cable manufacturers in the United States have been building up a market since the war, and they may even invade the United States with electric cables of European manufacture, he said.

★ ★ ★

"While the efficiency of the French plants is not as high as that of American plants, it is constantly improving, and of course the cost of labor in France is only

about one-third of what it is in this country," Mr. Schatzel pointed out.

★ ★ ★

There has been but slight use of aluminum in electrical wire and cable in Europe, principally because the supply of copper has been better there than in this country, he stated. However, a number of wire and cable manufacturers, and electric utilities, are experimenting with aluminum, just as are companies here. There are some excellently equipped laboratories in Europe, and technology is good.

★ ★ ★

Mr. Schatzel visited nine wire and cable plants in France, Switzerland, Germany, Italy, and England, and he said he was "amazed" by the progress that had been achieved, particularly in France, since his last previous European trip in 1945.

★ ★ ★

In Germany, he said, the companies have restored much of their equipment, but have not been able to do much modernization. However, "they're working hard, and doing the best with what they've got," he related. Italian industry is alert and progressive, but it lacks markets, and consequently there is widespread unemployment in that country, becoming worse, he said. This may have an important bearing on the elections next spring.

★ ★ ★

New plants in England for the most part are modern, but the tradition-loving British people are slow to adopt new methods and techniques, and their production rates are lower than those in France, according to Mr. Schatzel. Morale of the British worker is being affected by the heavy burden of taxes, food restrictions and low wages.

★ ★ ★

"Pride and confidence in their traditions, combined with the inherent character of the English, have sustained them through the past fifteen difficult years. It is a heavy load they are carrying; but I believe the same character will see them through," Mr. Schatzel said.

★ ★ ★

3 ways *Solar* solves a sales problem... IN YOUR FAVOR

...with SOLDURA GRAY WIRE COLOR SOLUTION

1 GREATER SALES APPEAL!

Gray Soldura gives the buyer visible evidence that the flameproof compound on non-metallic sheathed cable and service entrance cable is completely sealed and covered. Moreover, it camouflages service entrance cable used on white houses and forms an excellent base for the subsequent application of house paint.

2 STAYS CLEANER!

Gray Soldura *looks* cleaner because it *is* cleaner. It's used with a clear wax top dressing (which makes it easier to pull through joists or fish through conduits) and will not mark up walls during installation. Workmen's hands stay cleaner, too.

3 PROTECTS against STICKING!

Actual laboratory tests have shown that gray Soldura, applied with a proper saturant and finish, will prevent sticking at temperatures as high as 140°F. and will not flake off under freezing conditions.

FOR GREATER SALES APPEAL... FOR CLEANER APPEARANCE, EASIER HANDLING, AND FREEDOM FROM STICKING OR FLAKING... USE SOLDURA... THE GRAY WIRE COLOR SOLUTION THAT BUILDS SALES.

SPECIFICATIONS*

Weight per gallon	15-16 lbs.
Total solids	75-80%
Viscosity, Gardner Mobilometer @ 77°F., 250 grams load	15-20 seconds
Estimated coverage—Sq. Ft. per gal.	1250-1500
Number of coats recommended	Two, for best results
Colors	Light, medium and dark gray

**Gray Soldura is soluble in alcohol, acetone, and common lacquer solvents, but is not soluble in gasoline and petroleum solvents.*

FOR SPECIFIC INFORMATION ABOUT GRAY SOLDURA MS-551 AND A COMPLETE REPORT ON OUR LABORATORY TEMPERATURE TESTS, WRITE TO SOLAR COMPOUNDS CORPORATION.

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AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet

Subject: EFFICIENT PICKLING WITH RODINE®

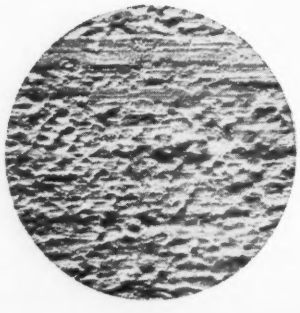
ADVANTAGES OF "RODINE"

RODINE is used in sulfuric and muriatic acid baths for improved pickling and increased production. It meets Government Specification U.S.N. 51-I-2.

In straight line pickling of wire, rod and tubing, RODINE makes available more metal for drawing by protecting steel from acid attack. In batch pickling of sheet steel, RODINE improves the surface. In rapid, continuous strip pickling, RODINE not only saves acid and metal, but also prevents over-pickling during line shutdowns.

◀ *This steel surface was pickled in an uninhibited acid bath. Note the deep pits, and that the surface is visibly crystalline.*

This surface was pickled exactly like the one above except that "RODINE" was added to the acid solution. Only scale pockets and roll marks are visible; no pitting occurred. ▶



CHEMICALS ACP PROCESSES

WRITE FOR DESCRIPTIVE FOLDER ON "RODINE" AND INFORMATION ON YOUR OWN PICKLING PROBLEM.

CHEMICALS ACP PROCESSES

Alloy Metal Wire Installs Group Management Plan

A new plan that has been working long enough to give indication of successful results is a Group Management plan, recently inaugurated by the **Alloy Metal Wire Co.**, Prospect Park, Pa.

★ ★ ★

The shop foremen, plant superintendent, assistant plant superintendent, industrial engineer, purchasing agent, sales development engineers, chief accountant and advertising manager are eligible for membership in a "Junior Board of Executives." Nine of the 22 eligible men are members at any one time. Every six months the nine members of the Board rate each other on the many points considered necessary to be good executives. The men with the four lowest ratings are dropped from the Board and four new members chosen from the balance of the eligibles. With this method of operation it is important to note that all eligibles will participate on the Board within a 24 to 30 month period. Even though a man has previously been dropped from the Board it does not prevent him from appointment to the Junior Board at a future date.

★ ★ ★

At the regularly scheduled meetings the Junior Board of Executives discuss the many problems confronting them in production, sales and engineering. After complete discussion has been held, such conclusions as are unanimously approved are forwarded to the Senior Board of Directors.

★ ★ ★

With this type of Group Management the Senior Board of Directors are able to obtain the thinking of those men who work in Junior Executive capacity, dealing with the daily production, engineering and sales problems. At the same time it gives the Junior Executives a feeling that they are actually participating in the operation of the company and that their ideas are receiving proper consideration by the company's management.

Outstanding Personalities of the Wire Industry

Sanderson Appointed Superintendent of Wire Mills at Keystone

Executive Committee of **Keystone Steel & Wire Company** recently announced the appointment of **John L. Sanderson,** 6204 S. Jefferson Avenue, Bartonville, as superintendent of wire mills, filling the position of John Moritz who died September 28, 1952.

★ ★ ★

The committee also revealed the promotion of **James W. Mahannah,** 307 McKinley Avenue, Bartonville, to assistant to the superintendent of wire mills. Mr. Mahannah was formerly wire mill chief clerk.

★ ★ ★

Mr. Sanderson, who started at Keystone July 13, 1929, is a veteran of 22 years at Keystone, first working as a laborer in the steel plant yard for a short time before being promoted to weigher and recorder in the open hearth.

★ ★ ★

The new wire mill superintendent worked third shift at Keystone while attending Bradley University, where he majored in chemistry, starring also in football and basketball.

★ ★ ★

On June 19, 1933, he started in the Keystone laboratory as a chemist where he worked until transferred to the wire mill in 1936 in charge of reclaiming scrap wire for reuse in the open hearth furnaces.

★ ★ ★

His climb up the ladder was steady and in 1937 he joined the late Mr. Moritz in the wire mill as chief clerk where he became familiar with wire mill operation and conditions. He is a director of The Wire Association and Chairman of The Ferrous Program Committee for The 1953 Annual Convention in Chicago.

★ ★ ★

June 1, 1936, marked the first day at Keystone for **James W. Mahannah,** who began as a helper in the electrical department. In July of last year Mahannah was promoted to chief clerk in the wire mill from the electrical department.

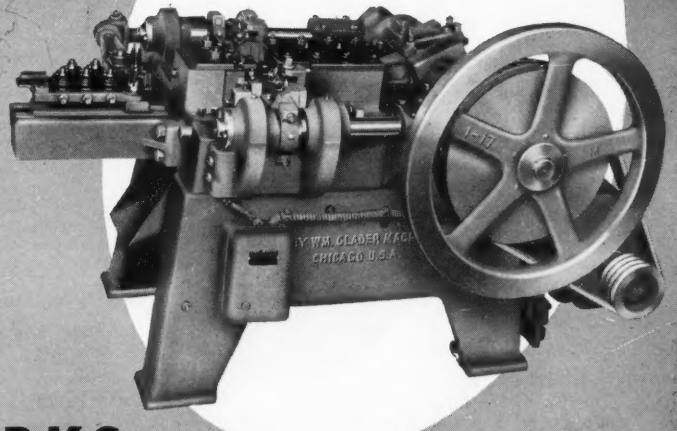
★ ★ ★

A graduate of Manual Training High School in 1919 where he was president of his class, Mahannah received his formal education in engineering at Bradley University, where he was graduated in 1923.

★ ★ ★

Formerly active in politics in

high efficiency — low cost
with GLADER wire nail machines



Eliminate costly down-time in the Nail Mill by replacing obsolete machines with new GLADER NAIL MACHINES . . . For tops in efficiency and economical operation use GLADERS.

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Bartonville, Mahannah served six terms on the village board of education and one term as village trustee. He is member of the Keystone Chorus and Methodist Church of Bartonville choir.

★ ★ ★

His son, James W. Jr., is assistant to William Brown, electrical department superintendent at Keystone.

Dawson J. Burns Elected President of Wheeler Insulated Wire Co., Inc.

Two executives have been named to top posts in the **Wheeler Insulated Wire Company, Inc.,** it has been announced by **Harry K. Vickers,** president of Sperry Corporation.

★ ★ ★

Dawson J. Burns has been elected president and a director of the company, succeeding **A. Roy Welton,** who retired at the close of 1952, and **Geo. B. Horn** has been named vice president and general manager of the firm.

★ ★ ★

Mr. Burns was formerly president of the Ward-Leonard Electric Company, Mt. Vernon, N. Y., which he joined following his graduation from Columbia University. He retired from the firm in 1949. He is still associated with the company in an advisory capacity. His long career included assignments as sales manager, general manager, president and chairman of the executive committee.

★ ★ ★

Mr. Horn has been identified with the Wheeler Company since 1934. He is a native of South Dakota and a graduate of Purdue University, class of 1914. He started his business career with the General Electric Corporation, Fort Wayne, Ind. Division. He later organized the Dudlo Manufacturing Company at Fort Wayne. It eventually merged with the General Cable Company and Mr. Horn was transferred to Rome, N. Y., as chief engineer. He became associated with the Wheeler Company in 1934 when the plant was located in Bridgeport. Prior to his new assignment he was serving as vice president and works manager. He designed the wire insulating machines now used by the Wheeler Company.

Carboloy Adds Three to Engineering Staff

. . . **Three** additions to the engineering staff of the **Carboloy Department of General Electric Company** in Detroit have been announced by **Ivan L. Wallace,** manager-engineering.

★ ★ ★

Dr. Robert F. Stoops has joined the advance development section. He was formerly a research engineer with the Harbison Walker Refractories Company in Pittsburgh. Dr. Stoops received his Ph.D. from Ohio State University.

★ ★ ★

(ILLUSTRATED)
42" x 20" x 21"—(4000# cap.)

HEAVY DUTY
BREAK-DOWN REELS

1000#
2000#
4000#
} capacities

Rugged Design including patented DURA-CURL rim, and many other features necessary to provide the *Strength* and *Durability* needed for continued successful performance.

Also complete line of sizes of Modern High Speed Wire Drawing NO-CREV Spools and Reels for both fine and intermediate size wire.

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Telephone
Attleboro 1-0848

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London W.I. England

#103

Anthony D. Cortese has joined the design and application section. He will specialize in magnetic applications. Cortese, recently released from active duty with the U. S. Navy, is a graduate of the University of Detroit, and was formerly a member of the General Electric Company's test engineering program in Schenectady.

★ ★ ★

Frank B. Nuelle has been transferred to the Detroit plant from the Carboloy Department's Schenectady operation. He will be assigned to the administrative engineering section. Nuelle is a graduate of the University of Notre Dame and a former supervisor of the General Electric Chemical and Metallurgical Training Program.

Ansonia Wire & Cable to Hold Board Meeting on Stock Issue, Officers

Ratification of the present slate of executives for another term and authorization of the issuance of 100,000 shares of common stock will mark a meeting this month of the board of directors of the **Ansonia Wire & Cable Company.**

★ ★ ★

It has been announced that the company is prepared to take over the complete assets and liabilities of the Ansonia Electric Company and the Ansonia electrical division of the Noma Electric Corporation in January, 1953.

★ ★ ★

The company recently acquired ten acres of land from the New Haven Railroad, but plans no immediate expansion of facilities for its present force of about 300 workers.

★ ★ ★

Alden P. Lunt is president of the company; **William Kircher,** vice president and treasurer; **Ross A. Pringle,** vice president and chief engineer; **Edward B. Anschutz,** secretary.

★ ★ ★

Mr. Lunt formerly served as divisional manager of the Noma Electric Corporation and has been vice president since 1951.

Scovill Names E. F. Anderson to Sales Post

The Scovill Manufacturing Company has announced the appointment of **Edward F. Anderson** as an assistant to **Paul E. Fenton,** vice president of manufactured sales. Mr. Anderson will establish his headquarters at the company's main office here. Since 1950 he has been associated with the firm's New York sales office. He will assist Mr. Fenton in the marketing, merchandising and promotion of Scovill's trade-marked products.

Faigenbaum Named Sales V-P of Fidelity Machine Company, Inc.

Joseph Vogt, president of **Fidelity Machine Co., Inc.,** Philadelphia, Pa., announces the appointment of Roy Faigenbaum as vice president in charge of sales, a position recently vacated by Howard Green.

★ ★ ★

An engineer with Fidelity for many years, Mr. Faigenbaum has been closely associated with the development of precision machinery for the textile, rubber and wire industries and is responsible

Nopco's DURPON drawing compounds—specifically developed for wet drawing of nonferrous wire, rods and tubes—are all on the alkaline side, to assure optimum die life, and are natural lubricants.

But the special advantage these improved compounds offer is *emulsion stability.* For incorporated into each Durpon product is a stabilizing additive which prevents breakdown of the effective drawing ingredients when the bath becomes contaminated by dirt, small amounts of carry-over acid and metallic particles.

Because Durpon additives help maintain normal balance between soap and lubricant, the stability of the drawing emulsion during recirculation is increased and the useful life of the emulsion lengthened.

As a matter of fact, Nopco® Durpon compounds not only provide optimum lubrication, but retain their initial degree of performance for *twice as long* as conventional compounds.

If you draw nonferrous materials, Durpon compounds will assure you *better, drawing results* and *reduced drawing costs.*

Immediately available are:

DURPON
for intermediate gauge wire

DURPON L
for heavy wire, rods, and tubes

DURPON FW
for fine wire

Fill out and mail the coupon. We'll send you a technical bulletin and trial-size order promptly.

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Gentlemen: Please send me a copy of your Bulletin giving information about Nopco DURPON Drawing Compounds.
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Company.....
Address.....
City.....Zone.....State.....

for many of the improvements on this equipment. His technical and sales experience provide an excellent background for his new duties.

★ ★ ★

Asked about the plans for Fidelity, Mr. Vogt stated that they expect 1953 to be the greatest year in the history of the company.

Phelps Dodge Man Honored In England

W. A. Del Mar, Chairman of Research and development Committee of **Phelps Dodge Copper Products Corporation,** and Chief Engineer of the **Habirshaw Cable & Wire Division** of that company, has returned from London where he received the Fellowship of the City and Guilds of London Institute, the diploma of which was presented to him by Prince Philip, Duke of Edinburgh.

★ ★ ★

This degree is awarded to graduates of the City and Guilds College, a department of the University of London, for "outstanding contributions to the industry in which they are engaged."

★ ★ ★

After leaving London, Mr. Del Mar visited continental cable companies with which Phelps Dodge has technical affiliations.

Becomes District Manager of Operations for C.F.&I.

Appointment of **Fordyce Coburn** effective December 11, 1952, as District Manager in Charge of Operations for the E. & G. Brooke, Claymont and Buffalo Plants of **The Colorado Fuel and Iron Corporation** has been announced by J. J. Martin, Vice President in Charge of Operations, at the Executive offices of the Corporation in New York City.

★ ★ ★

Mr. Coburn is a graduate of Massachusetts Institute of Technology. From 1927-1944 he worked in the employ of the Wisconsin Steel Division, International Harvester Company. He served as Vice President of the E. & G. Brooke Company and the Richard Ore Company from 1944 to 1952, prior to their merger with The Colorado Fuel and Iron Corporation.

★ ★ ★

Mr. Coburn will continue to serve in the capacity of General Plant Manager of the E. and G. Brooke Plant and as Vice President of Richard Ore Company. His headquarters will be located at Birdsboro, Pa.

★ ★ ★

At the same time announcement was made of the appointment of **John V. Boardman** as Works Manager of the Claymont plant.

NRM

"ALL-IN-ONE"... WIRE COVERING UNIT

Includes:

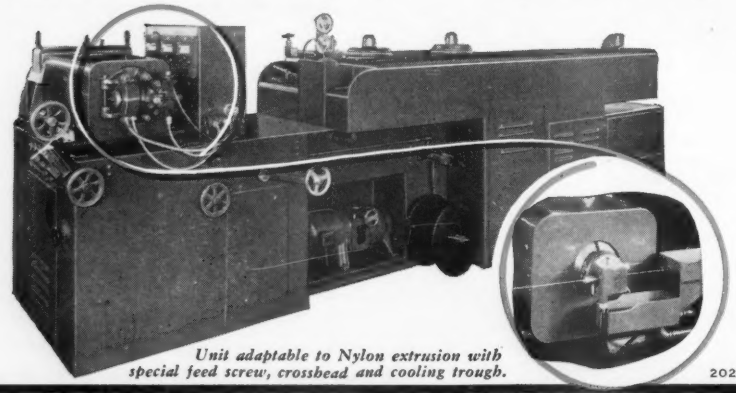
NRM's 1½" Package Wire and Cable Covering Unit packs the maximum of production into the minimum of floor space. Measuring only 13'x4'2" on its single base, this compact unit carries all the equipment needed to cover wire up to ¼" covered diameter at speeds up to 1000 feet per minute.

All wire covering plastics can be handled on this precision-built equipment — including Nylon, with a few simple changes. The automatic driven let-off is controlled by wire tension. The electrically heated 1½" extruder is equipped with Balanced Heat Control. The haul-off capstans are variable speed driven. The torque controlled dual take-up has 16" standard reels. Ample space is provided for a spark tester.

This unit is also available with an oil heated extruder.

Write, right now, for detailed information!

- Driven Supply Reel
- Wire Straightener
- NRM 1½" Extruder
- Variable Speed Drive
- Electric Die Heater
- Water Cooling System
- Dual Haul-off Capstans
- Dual 16" Take-up
- Adjustable Traverse
- Single Base Mounting



Unit adaptable to Nylon extrusion with special feed screw, crosshead and cooling trough.

2022

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Creative Engineering

THE 1953 WIRE & WIRE PRODUCTS BUYERS' GUIDE

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WIRE AND WIRE PRODUCTS
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H. H. Robinson

Henry H. Robinson, retired Pittsburgh industrialist, died at his home in Sewickley Heights, Pa., on January 9th at the age of 79.

★ ★ ★

Mr. Robinson had spent most of his industrial career with the National Electric Products Corporation and had retired two years ago. He was graduated from Yale University.

★ ★ ★

In 1905, he assisted his brother, W. C. Robinson, in organizing the National Electric Products Corporation, which has grown to be one of the nation's largest manufacturers of electrical wiring products. The company's main plant is in Ambridge, Pa., and a new plant was recently opened in New Jersey. W. C. Robinson is still the concern's president and chairman of the board.

★ ★ ★

Lyman Daniel Adams

Lyman Daniel Adams, West Hartford, vice president of the Associated Spring Corporation, died on January 2nd at the Hartford Hospital after a brief illness.

★ ★ ★

As a youth Mr. Adams worked at the Stanley Works in New Britain and the New Departure plant in Bristol. He entered the service of Wallace Barnes Company in 1914 and became manager of its steel mill in Forestville. He was subsequently appointed general manager of the Barnes-Gibson-Raymond Company in Detroit, which later became affiliated with the Associated Spring Corporation. He returned to the Bristol division of Associated Spring in 1948. He became a director of the company in 1929 and vice president in 1946.

★ ★ ★

Mr. Adams was a native of Hartford.

John A. Ingwersen

John A. Ingwersen, Vice President in charge of Distribution, **Armco Steel Corporation,** died unexpectedly of a heart attack at his home in Middletown on December 5, 1952. He had been with Armco since 1923 and was also a Director of Sheffield Steel Corporation, Kansas City, Missouri, a subsidiary of Armco.

AIEE Names Hickernell

L. F. Hickernell, chief engineer, **Anaconda Wire & Cable Co.,** Hastings-On-Hudson, N. Y. has been elected a member of the board of directors of the **American Institute of Electrical Engineers.** His term as director begins on January 1, 1953 and extends through July, 1954.

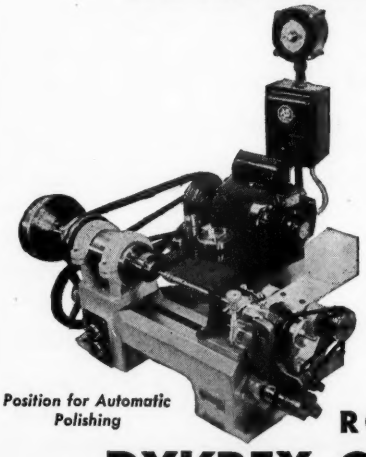
★ ★ ★

W. J. Barrett who resigned as Director (the position to be occupied by Mr. Hickernell) was elected Treasurer. Mr. Barrett is Electrical Coordination Engineer for the **N. J. Bell Telephone Co.,** Newark, N. J.

NEW DYKREX POLISHERS CUTS DIE FINISHING TIME and LABOR COSTS 50%

NEW MODEL "M" DYKREX POLISHING and FINISHING MACHINE

It's Automatic with Split-Second Changeover!



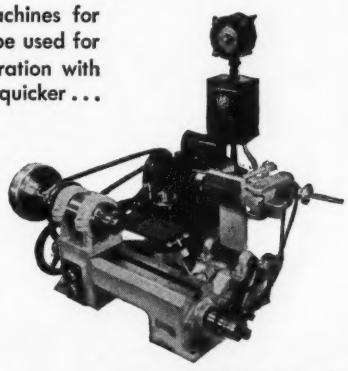
Position for Automatic Polishing

Here's the newest in LABOR-SAVING machines for re-finishing Tungsten Carbide dies. It can be used for manual, semi-automatic or automatic operation with timed switch. It finishes the die faster . . . quicker . . . and better.

It's complete . . . no changeovers . . . no lost parts . . . (no removal of parts . . . to "stall" for hand-finishing work.)

PROMPT DELIVERY

Replace your outmoded machine with our new LABOR-SAVING machine *NOW!*



Position for Hand Finishing

WIRE OR WRITE FOR DETAILS

ROOS TOOL & MFG. DIV.

DYKREX CORPORATION of AMERICA

33-35 BLOOMFIELD AVENUE **NEWARK 4, NEW JERSEY**

A Review of Recent Wire Patents

No. 2,619,663, WIRE CLEANER, patented December 2, 1952 by Gordon Adolph Johnson, Chicago, and Peter Stanley Jaskowiak, Elmwood Park, Ill.

The cleaner is adapted to clean the ends of wire preparatory to soldering.

★ ★ ★

No. 2,620,073, MILK CAN RACK, patented December 2, 1952 by Roy Lambert Meyers, Janesville, Wis.

A knock-down rack is provided comprising lengths of wire or rod.

★ ★ ★

No. 2,620,074, BASKET, patented December 2, 1952 by Junius T. Moore, Jr., Charleston, W. Va., assignor to Moore Company, Charleston, W. Va., a corporation of West Virginia.

In reality this is a combination clothes hanger and basket and is constructed of wire. There are 9 claims.

★ ★ ★

No. 2,620,496, DESCALING AND BRUSHING MACHINE, ESPECIALLY FOR ROUGH-DRAWN WIRE, patented December 9, 1952 by Jean Peignier, Bigny, France, assignor to Societe Metallurgique de Gorcy, Paris, France, a body corporate of France.

Brushes are employed with the bristles being oppositely disposed in such manner that the plane of juncture between the bristle ends coincides with the axis of the bore through a hub, through which the wire passes. A drum, rotated by movement of the wire, rotates the brushes.

★ ★ ★

No. 2,620,531, PLASTICBOARD LATH CLIP FOR METAL STUDDING, patented December 9, 1952 by Franklin R. Chandler, San Diego, Calif.

This clip is constructed of a single length of wire. Five claims.

★ ★ ★

No. 2,620,532, FASTENER CLIP, patented December 9, 1952 by William A. Bedford, Jr., Hingham, Mass., assignor to United-Carr Fastener Corporation, Cambridge, Mass., a corporation of Massachusetts.

Wires or strips are provided to form the clip with the exception of means to secure the wires or strips together.

★ ★ ★

No. 2,620,618, TRIANGULAR STRAND FOR CABLES, patented December 9, 1952 by Alexandre Chamoux, Bourg, France, assignor to Societe Trefilerie & Cablerie de Bourg, Bourg, France, a French joint-stock company.

A triangular strand for cables is provided comprising an inner circular core; and three wires of circular cross-section spirally wound on this core in equally spaced relation, the wires being of such a diameter as to determine a triangular outer profile tangent to the circular profile of the core; the inner circular core being formed of a circular strand of wires, and the outer layer of the circular strand having a winding pitch different from the pitch of the three wires wound on the inner circular core.

★ ★ ★

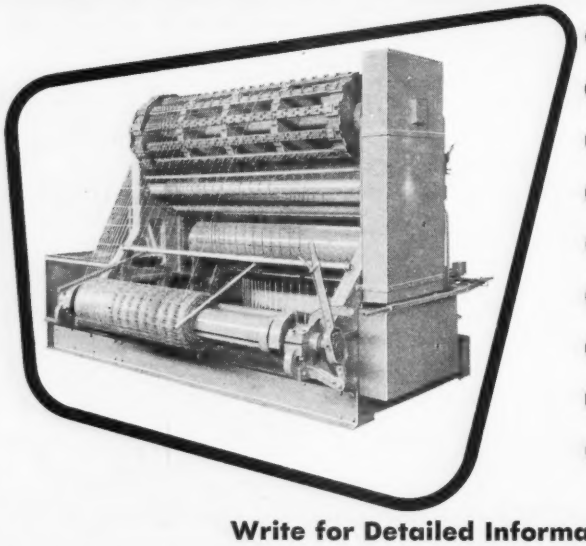
No. 2,620,769, MEANS FOR HANDLING AND VARNISHING ELECTRICAL WINDINGS, patented December 9, 1952 by Nathaniel B. Ornitz, Pittsburgh, Pa., assignor to Blaw-Knox Company, Pittsburgh, Pa., a corporation of New Jersey.

Heating and impregnation of electrical windings is said to be carried out on a production line basis by progressive heating.

★ ★ ★

No. 2,620,990, METHOD AND AP-

Interlocking FENCE LOOMS



- Fastest — Most Efficient
- Preferred by Leading Mills
- Low Maintenance Cost
- Wrapped Stay Fence
- Straight Stay Wires
- Integrated — Space Saving
- Replaceable Main Bearings
- Single or Double Strands
- Years of Low Cost Production

Write for Detailed Information — Without Obligation

Interlocking Fence Co., Box 8, Morton, Ill.

Specialists In Fence Looms

PARATUS FOR WINDING RESISTANCE ELEMENTS, patented December 9, 1952 by Henry H. Cary, Alhambra, Roland C. Hawes and Michael E. Stickney, Los Angeles, and Kenyon F. George, South Pasadena, Calif., assignors to Beckman Instruments, Inc., a corporation of California.

A method of winding a resistance wire about a core member to form a resistance element of accurately controlled resistance per unit of length is disclosed. There are 16 claims.

★ ★ ★

No. 2,620,995, WIRE RETAINING DEVICE, patented December 9, 1952 by Marius Larcinese, Glassport, Pa.

A wire-coil-retaining device for use with the wire-drawing block of a high speed wire drawing apparatus is contained in this patent.

★ ★ ★

No. 2,620,997, WIRE CONTAINER, patented, December 9, 1952 by James G. Lyon, Detroit, Mich., assignor of forty-nine per cent to Joseph James Habib, Sr., Detroit, Mich.

This container is for wire such as used for electrical wiring and it is said the construction of the container prevents tangling of the wire.

★ ★ ★

No. 2,621,451, APPARATUS FOR MAKING AND MOUNTING PERFECT SCREWS, patented December 16, 1952 by John Donovan Strong, Baltimore, Md.

Apparatus for accurately finishing rotationally symmetrical work having irregularities thereon.

★ ★ ★

No. 2,621,703, METHOD OF MAKING AN ELECTRICAL CABLE, patented December 16, 1952 by James J. Morrison, Worcester, Mass., assignor to United States Steel Company, a corporation of New Jersey.

The method comprises assembling a number of insulated wire conductors so as to have valleys between them, extruding a generally tubular inner jacket and filler forming member of a vulcanizable elastomer completely around and into contact with the assembled conductors, such elastomer containing a sufficient quantity of a blowing agent to cause the elastomer to expand in volume from 25 to 100% when vulcanized in place around the cable, extruding an outer jacket forming body around the inner jacket and filler forming member, the outer jacket forming body being composed of a vulcanizable elastomer of such composition that when vulcanized it forms a dense, tough material.

★ ★ ★

No. 2,621,779, FLAT WIRE CONVEYER BELT AND COVER PLATE THEREFOR, patented December 16, 1952 by Noah S. Harter, Waukegan, Ill., assignor to United States Steel Company, a corporation of New Jersey.

More specifically, the invention relates to novel cover plates over the flat wire links.

★ ★ ★

No. 2,621,834, ADJUSTABLE WIDTH SINGLE-PIECE GARMENT HANGER, patented December 16, 1952 by David B. Irving, Columbus, Ohio.

The hanger is composed of a single length of wire bent to shape.

★ ★ ★

No. 2,622,152, HIGH ATTENUATION COAXIAL CABLE, patented December 16, 1952 by Samuel J. Rosch, Yonkers, N. Y., assignor to Anaconda Wire and Cable Company, a corporation of Delaware.

This cable is adapted for conducting currents at frequencies above 100 megacycles. About the central wire conductor is a layer of suitable high frequency insulation and an outer metallic conductor surrounding the dielectric, characterized in that a tape of paper about 0.001 to 0.010 inch in thickness impregnated with carbon black is wrapped helically about the dielectric beneath the outer metallic conductor, whereby heat produced in consequence of power dissipation during operation of the cable at a high frequency is developed entirely outside the high-frequency insulation where it is readily transferred to the surrounding atmosphere.

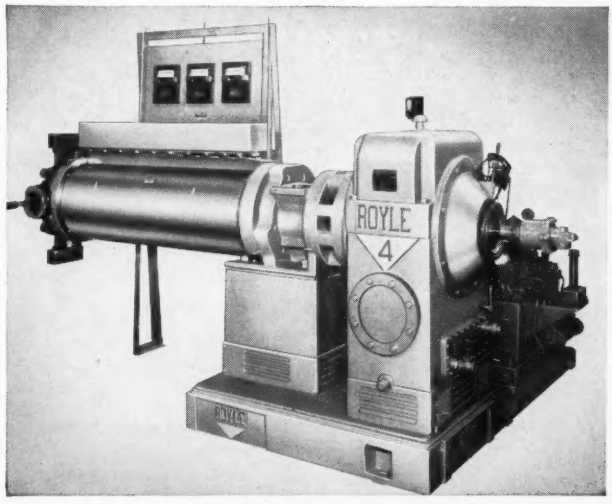
★ ★ ★

No. 2,622,860, APPARATUS FOR CONTINUOUSLY PROCESSING

ROYLE

SPIROD* EXTRUDERS

Built by America's oldest builders of extruding machines Royle Spirod extruders are the result of more than seventy years experience in the design of extruding machines. Time tested and proven features are built into Royle Spirod extruders to assure maximum productivity at minimum operating cost. These features include: Heavy steel members without flanges . . . Spirally installed rod type heating elements to provide faster, steadier, more evenly distributed heat . . . Complete insulation of cylinder and head to reduce heat loss with substantial power savings . . . Separate heating zones controlled by proportioning instruments.



CHECK THESE FEATURES that assure profitable and trouble-free production of such items as plastic insulated wire, flexible and rigid pipe, plastic sheeting, plastic clothes line, to mention a few of the products that are produced daily with Royle Spirod extruders.

*Patent Applied for

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

London, England	Home Office	Akron, Ohio	Los Angeles, Cal.
James Day (Machinery) Ltd.	V. M. Hovey J. W. VanRiper	J. C. Clinefelter	H. M. Royal, Inc.
REgent 2430	SHerwood 2-8262	JEfferson 3264	LOgan 3261

PATERSON 3, NEW JERSEY

STRANDS, patented December 23, 1952 by Edwin T. Lorig, Ross Township, Allegheny County, Pa., assignor to United States Steel Company, a corporation of New Jersey.

The strands are furnace heat treated while upon a continuous strand helical conveying reel extending axially through the furnace, and then cooled.

★ ★ ★

No. 2,623,093, ELECTRICAL COMMUNICATION CABLE, patented December 23, 1952 by Esmond Wassell Smith, Beechcroft, Chislehurst, England, assignor to Canada Wire and Cable Company Limited, Leaside, Ontario, Canada, a corporation.

A multi-wire core high frequency land communication cable is described.

★ ★ ★

No. 2,623,550, METHOD OF MAKING SPLIT RINGS, patented December 30, 1952 by Maurice Artoni, Paris, France, assignor to Pierre Drayfuss-Baumann and Alexandre Lilienfeld, both of Paris, France.

The method of making split-type retaining rings is disclosed consisting of winding wire having inherent resilient characteristics on a mandrel having at least four sides, removing the helical coil therefrom and permitting the coil to assume a natural shape resulting from the inherent resiliency thereof, feeding the coil on a second mandrel having plural sides thereon, the number of which exceed by one the number of sides of the first mandrel, and cutting the coil longitudinally to sever each winding thereof to form individual retaining rings.

★ ★ ★

New Hand Cleaner Announced

Magnus Chemical Company, Inc., Garwood, N. J. announces the marketing of Magnus Waterless Hand Cleaner. While primarily for use where water is not convenient or available, this product is water soluble. It rinses thoroughly, leaving dirty hands clean, with no oily residue.

★ ★ ★

This cleaner removes grease, paint, tar, grime, inks including litho and stencil. A white stiff jell containing a generous amount of Lanolin, it has no odor of solvent or ammonia. When water is not available it may be wiped off with a towel, leaving the hands soft, without a tacky feeling. Containing no alkali, it is neutral in its reactions and will not irritate or dry out the skin.

★ ★ ★

Complete information about this product may be obtained by writing to Magnus Chemical Company, Inc., department **W & WP** Garwood, N. J.

International Paper Plans Converting Plant in California

Plans for construction in Los Angeles of a new converting plant for the production of corrugated fibre shipping containers were announced recently by **W. S. Snyder, Manager, Container Division, International Paper Company.**

★ ★ ★

The new plant, which will be located in the Central Manufacturing District at 6150 Sheila Street, will replace facilities in the Vernon section of Los Angeles purchased in 1947 from Owens-Illinois Glass Company. **L. M. Smith,** Resident Manager, will continue to be in charge of the new facilities.

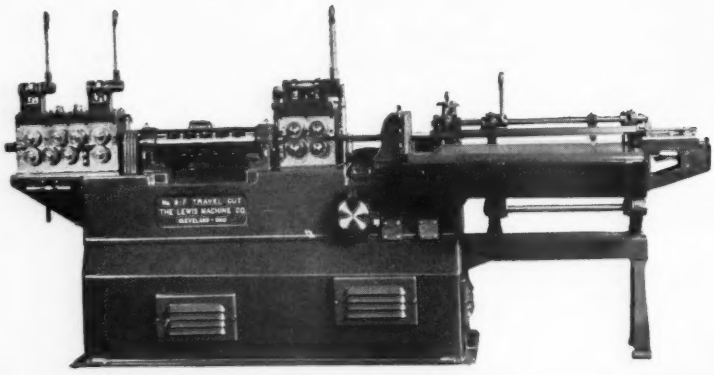
★ ★ ★

Plans call for an over-all plant

Fast, Accurate, Economical

STRAIGHTENING and CUTTING

with LEWIS TRAVEL-CUT



22 Models to handle from 1/16" to ¾" Round, Hex, Flat, Shapes.

Simple in design, rigid in construction, Lewis TRAVEL CUT will deliver continuous dependable service under the most severe, high production conditions—day in, day out. Feeds wire from the coil, straightens accurately, gauges to uniform length, and cuts clean without stopping the wire. For steel, brass, aluminum and alloy wire. Cut your cutting costs with the Lewis TRAVEL CUT. Full details on request.

Exclusive Representatives

EAST: Penn Machinery Co., 117 North Third Street, Philadelphia 6, Penn.

MIDDLE WEST: Steel & Wire Machinery Co., 15457 Euclid Ave., Cleveland 12, O.

CENTRAL: Moslo Machinery Co., 2443 Prospect Avenue, Cleveland 15, Ohio.

WEST COAST: Hoffman & Heartt, 3065 So. Grand Ave., Los Angeles 7, California.

CANADIAN: Empire Engineering Co., 11 Wellington St. E., Toronto 1, Ontario.

CONTINENTAL EUROPE: Gaston E. Marbaix Ltd., Devonshire House Vicarage Crescent, London S. W. 11, England.

The LEWIS MACHINE Company

3441 E. 76th Street, Cleveland 27, Ohio

Also agents in Paris, Stockholm, Rotterdam, Brussels, Zurich, Milan, Bombay and Melbourne

area of 175,000 square feet, including office and a roll stock warehouse designed to accommodate 6,000 tons of kraft container board and Chemfibre corrugating medium. The presently occupied building has a total floor area of 96,000 square feet. Planned capacity of the new manufacturing unit will be 48,000 tons per year.

★ ★ ★

Equipment of the new building will include all present machinery plus a modern 85-inch Langston corrugator and supplementary equipment to handle the new tonnage.

★ ★ ★

International Paper's Container Division manufactures corrugated and solid fibre shipping containers from unbleached kraft linerboard. Other converting plants of the Container Division are located in Massachusetts, New Jersey, South Carolina, Ohio, Illinois, Kansas, Missouri and Louisiana.

Universal-Cyclops Names New Asst. Technical Dir.

Gilbert Soler, formerly in the research and development department of the **U. S. Steel Company,** has joined **Universal Cyclops Steel Corporation,** Bridgeville, Pa., as assistant technical director, it was announced yesterday.

★ ★ ★

Mr. Soler received a master of science degree from Ohio State University and spent several years with Timkin Roller Bearing Company in various technical and operating capacities. More recently, he was vice president, manufacturing operation, at Atlas Steels, Ltd., Welland Ont.

Dow Corning Holds Series of Exhibits about Country

The Dow Corning Corporation, Midland, Michigan, has been holding a series of exhibits in various parts of the country showing the numerous forms and applications of this most versatile silicone resin.

★ ★ ★

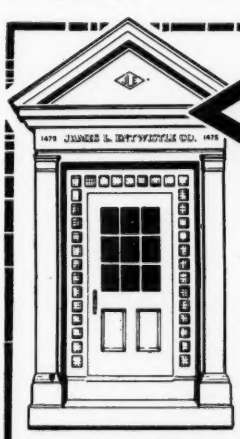
Of interest to our industry was an exhibit of silicone varnishes and extrusion compounds and their applications to cords, lead wires, cables, etc., made for extreme high and low temperature or acid resisting applications. They were also shown in tape and sheet forms for electrical uses, in which glass fibers and mica are used for reinforcement or added dielectric strength.

★ ★ ★

Good attendance was recorded, evidencing a desire on the part of many present and potential users to learn more about silicones, the use of which is growing so rapidly that a large expansion project is under way that will enable their several plants to increase production materially.

50-Year Index to ASTM Technical Papers and Reports

This 50-Year Index provides a detailed author and subject index to all the ASTM technical papers and reports dealing with materials, particularly their properties and testing, appearing in ASTM publications covering the period from



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SERVING THE WIRE INDUSTRY THROUGHOUT THE WORLD

- Caterpillar Pull-outs
- Standard Sets of Spark-Testing Equipment
- Take-ups and Re-spoolers
- Reelers
- Coilers
- Spoolers
- Collapsible Coiling Reels
- Wire Sparkers and Accessories
- Hand Locators
- Electrode Units and Stands
- Measuring Machines, Counters and Accessories
- Wire Guide Units
- Pay-off Reels Stands
- Electronic Devices
- Shaftless Take-ups and Payoffs
- Wire Pre-Heater
- Disk Brakes and Controls, Drag Units and Slip Clutches
- Wire Marking Machines, Type Strips, Inks
- Labelling Machines
- Pneumatic Equipment and Controls
- Special Machinery for the Wire Industry
- Hydraulic Equipment and Controls
- Hi-Pot Test Sets
- Cable Handling Equipment for Warehouse Use

See page 150 for News of JLE 6 Fixed or Swivel Mounted Pay-off Stands

JAMES L. ENTWISTLE CO.

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JLE - JLE - JLE - JLE - JLE

1898 through 1950. From 1898 to 1902 the Society was known as the American Section of the International Association for Testing Materials. In 1902 the Society obtained its charter and was reorganized as the American Society for Testing Materials.

★ ★ ★

This Index is intended to make readily available to the materials technologist, the researcher, the librarian, and all others concerned with the fields covered, pertinent information on a particular subject. Every effort has been made, after consultation with many users of indexes, to make available a ready means of locating information relative to a particular subject (or author) with a minimum expenditure of time and effort, without making the index too unwieldy.

★ ★ ★

The Index is concerned basically with technical papers which have appeared in Proceedings, ASTM BULLETIN, Special Technical Publications, or special compilations of standards. In addition, a number of technical reports have been referenced which, while not credited to a specific author, nevertheless provide worth-while data and information which should be considered when searching the available data in ASTM publications on a specific subject. Many of these reports are the result of cooperative effort in technical committees.

★ ★ ★

Certain innovations are embodied in this Index—for example, the author index which precedes the subject listings gives the complete titles of papers and items covered. This makes it possible to present the subject index, by far the major portion of this publication, in a condensed and easily usable form.

★ ★ ★

The subject index includes hundreds of headings, and every paper or report referenced is listed under the major subjects and materials discussed. There is a separate condensed subject index listing all of the technical symposiums.

★ ★ ★

Copies of this 216-page publication, in red cloth binding, 6 by 9 in. page size, can be procured from ASTM Headquarters, 1916 Race Street, Philadelphia 3, Pa., at $6.00 per copy.

No Soap—at the Draw Bench

A new lubricant, manufactured by the **Reilly-Whiteman-Walton Company**, Conshohocken, Penna. promises to rid wire mills of the dust problem that exists with present dry drawing lubricants. As it is practically impossible to avoid getting soap dust on machines and mill floors, wire mills have always had a difficult housekeeping problem. When the cost of the soap that goes on the floor is considered, it comes to quite an item.

★ ★ ★

The new lubricant, branded Die Gard 59, is not used at the draw bench, and nothing at all is put in the die boxes! Die Gard 59 is applied as a coating and goes on the rod or wire along with borax. It is an additive to the borax tank and the single Die Gard 59-borax dip takes the place of any other coating that might be applied. Thus

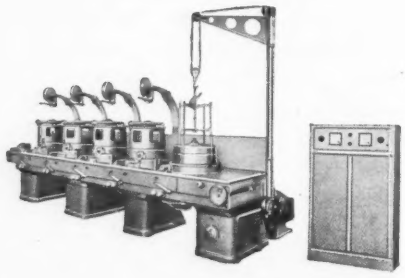
EW

Wire Drawing Machines, working on the dry or wet method (soap powder or by immersion) for iron, steel, copper, aluminum and other metal wires.

Metal Wire Cloth Weaving Looms (fly & mosquito nets, sieves, plastering work, etc.)

Automatic Straightening and Cutting Machines

Machines for producing: Wire nails and wire tacks, rivets, iron & wood screws, small nuts, welded and non-welded chains, knotted chains, barbed wire, wire pins, safety pins, hair clips, spokes and nipples for bicycles, etc.



EMILIO WARTENWEILER,

MILAN (Italy), Via Pergolesi, 18.

Tel. 21 245

no additional operations are involved.

★ ★ ★

The wire may be baked at temperatures up to 400° F., although this is not necessary as long as all of the water is dried from the coating prior to drawing. Die Gard 59-borax coatings are being used on high and low carbon steel wire on sizes from rod down to as fine as .018. Wire is being drawn through as many as six dies at full bench speeds. The coating is also being used on alloy steels and on non-ferrous wire and shapes.

★ ★ ★

Bench operators have been enthusiastic with the elimination of soap dust, but even more important is the indication that die life is being extended. This may be the result of having the lubricant firmly bonded to the surface instead of depending on a rapidly moving wire picking up sufficient lubricant in passing through the soap powder in the die box. Another explanation is that mixing of lime and soap, according to individual bench operator's preference is eliminated.

★ ★ ★

The drawn wire has a normal dull finish and the coating which remains after passing through six dies is suitable for subsequent operations, such as spring forming.

★ ★ ★

The process has been under plant test for over six months and coated wire stored during the strike showed no evidence of rust or deterioration of the coating. One large steel wire mill has now changed over to the process and others are using it continuously on a growing portion of their production.

New Tungsten Carbide Catalog Available

The Metal Carbides Corporation, Youngstown 5, Ohio, announces the publication of a new 72-page general catalog 52-G which covers their full line of tungsten carbide products, including cutting tools, draw dies, bushings, gages, centerless blades, rolling mill work rolls, diamond wheels and wheel dressers, and solid carbide stock.

★ ★ ★

Extensive engineering data is included on speeds and feeds, brazing and grinding instructions, grinding wheel recommendations, coolants, etc.

★ ★ ★

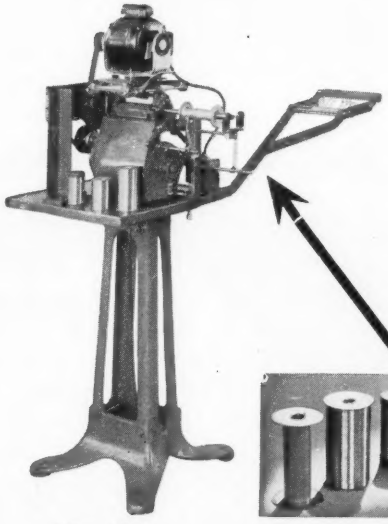
A considerable number of new products have been added to the Talide line of cemented carbides with standard package quantity discounts extended to include many items not heretofore covered.

New Totally Enclosed Motor Announced

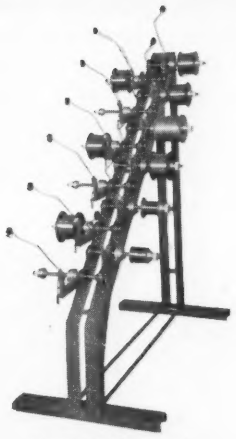
A new totally-enclosed motor has just been developed by **U. S. Electrical Motors Inc.,** designated as Type SS. It is designed for services where dampness, dust, fire hazards and corrosive fumes are prevalent. Because of its construction, Type SS is self-cooling. This eliminates the use of an exterior fan and any unsightly, heat-dissipating fins. The smooth exterior greatly lends itself to wiping off

STANDARD UNI-DRIVE WIRE WINDER.

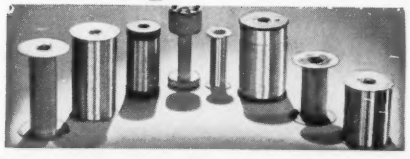
INCREASE YOUR PRODUCTION WITH THIS WINDER



Wire Winder



Pay-off Attachment



Various types of supply packages that may be wound on Standard Uni-Drive Wire Winder.

PAYOFF

Our payoff attachment is made with self-aligning ball bearings and a compensating attachment to control the tension of each end. Applies same tension when spool is empty as when full.

The new Uni-Drive Winder with Payoff Attachment is new in design and incorporates several improved and tested features. Production is stepped up through increased speed. It produces smooth, even and accurately wound spools of wire in single or multiple ends. All strands parallel—no over or under-winding. Automatic Stop-Motion controls each strand. Compensating attachment produces perfectly controlled tension. Traverse adjustable from 1¾" to 5½" between spool heads without changing cam. Designed especially for winding wire to be braided and shielded for electrical conductors up to ¾" diameter.
Payoff can be equipped with Carboloy Guide Inserts at additional cost.

STANDARD MILL SUPPLY
PAWTUCKET, R.I., 1064-1080 Main St.
NEW YORK, N.Y., 6708 Empire State Bldg.
CHARLOTTE, N. C., 2319 Hutchison Ave.

or hosing down—an important feature for motors to be used in dusty and dirty locations. Type SS is also provided with a slinger to protect the output shaft bearing against the entrance of dirt or water.

★ ★ ★

This motor, also available in Type SES, has been approved for explosion-proof service in hazardous locations by the Underwriters' Laboratories, Inc., and bears the official label.

★ ★ ★

"All of these new carbide machining and grinding methods," according to Mr. Beardslee, "utilize electrical power in one method or another to cut the carbides." He explained that all these methods do not necessarily eliminate the use of diamonds. Some still utilize diamonds but cut down substantially on the wear of the diamonds. This decreased consumption will greatly assist in lessening the demand for industrial diamonds, he added.

★ ★ ★

At present restrictions on the use of industrial diamonds have been placed on manufacturers by the Department of Commerce.

★ ★ ★

"While the supply of these diamonds is not necessarily acute right now," he commented, "we are faced with an immediate need to conserve diamonds for future use if the time should come when they were not readily obtainable from their existing South African source."

★ ★ ★

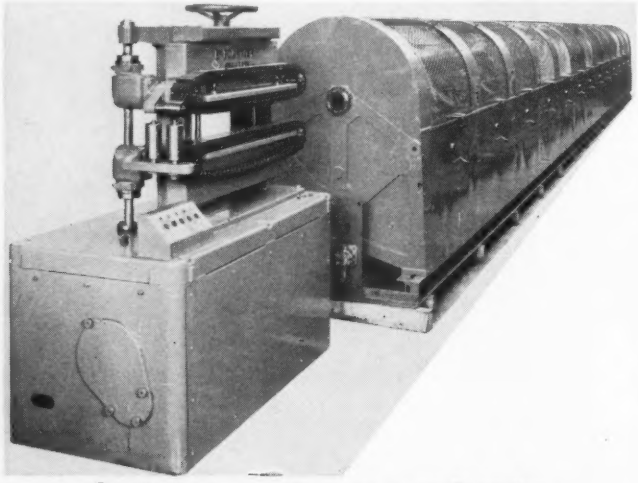
These new motors are available in a range from 1/3 to 2 h.p. (also fan-cooled to 75 h.p.) and will later be produced in larger ratings. Complying to N.E.M.A. Standards, Types SS and SES have these additional features: sealed terminal chamber; normalized castings; asbestos-protected windings; solid centricast rotor and an exclusive feature, Lubriflush bearings which provide an extra large lubricant chamber and provision for forcing the grease through the bearing for a thorough purge of the old grease. For additional information, ask for new Bulletin No. 1784. Write to U. S. Electrical Motors Inc., Box 2058, Terminal Annex, Los Angeles 54, California.

New Cold Cleaners Developed

Industrial metal cleaning can be streamlined into a low cost but highly efficient process with the aid of "cold cleaners" recently developed by the Metal Research Staff of **E. F. Houghton & Co.**

★ ★ ★

Used at room temperature in power washers, the new Houghto-Clean 439 and 440 combination effectively removes such soil as heavy drawing oils, pigmented drawing compounds, sulphurized cutting oils, rust preventives, and polar type smuts from ferrous



- Constant paper tension easy to predetermine.
- Haul-off by our caterpillar, Maillefer patented.
- Lockheed braked.
- Handling large drums.

ASK FOR INFORMATION

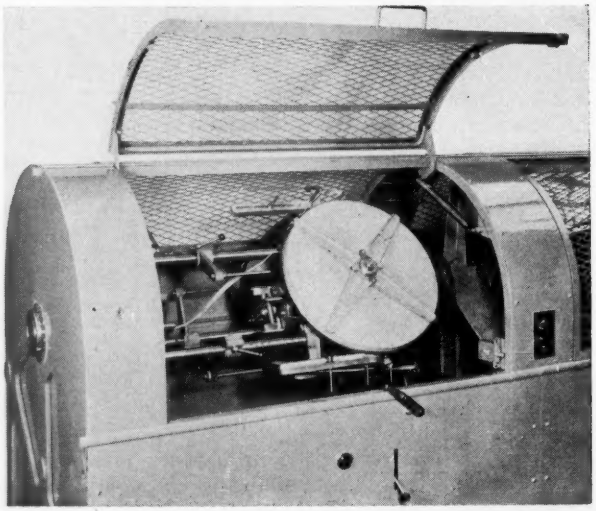
POURTIER MACHINES

153, rue Galliéni, ROMAINVILLE (Seine) FRANCE

ARE YOU SURE YOU HAVE THE BEST TAPING MACHINE FOR LOW AND MEDIUM TENSIONS?

HERE IS OUR No. 8 MACHINE:

- 3" and 4" bore.
- 20" paper cheese diameter.
- 400 RPM.
- Stop motion.



metals, copper and brass.

★ ★ ★

Because no heat is required, this cold cleaning team lowers operating and maintenance costs. Steam lines, ventilators, stacks, exhaust fans, etc., can be eliminated. As there is no steam or toxic "mist" involved, these cleaners also help improve shop conditions. Other advantages proven in use are: lasting stability, which provides extra economy, protection against rust and simplicity of preparation and use.

★ ★ ★

A descriptive 4-page leaflet completely descirbing the cold cleaners can be obtained without charge by writing E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Survey on Material Handling Available

One of the most comprehensive surveys on Material Handling ever published is available from the Consulting Engineering Firm of **Wheeler-Brady, Inc.** 15017 Detroit Ave., Cleveland 7, Ohio. This survey is part of the famous Wheeler-Brady Cost Reduction Training Program, now in use by major American firms.

★ ★ ★

Among the subjects covered in the survey are: Material Handling Principles, Material Handling Equipment, Changing Existing Methods, Planning A New Layout, Warehouse and Storage, Increased Capacity, Product Protection, Safety, Morale, Obtaining Better Service, and Increasing Operating Efficiency and Lowering Costs.

★ ★ ★

Also included is a valuable Check Sheet which will enable plant personnel to study and evaluate present material handling operations It is also designed to test the present activities of operating personnel.

This literature, published by Wheeler-Brady as a service to American Industry, will be of tremendous aid to any user of material handling equipment, big or small. In addition to an examination of basic material handling theories and equipment, it details the more comprehensive aspects of this vital subject. The survey is already considered a bible by cost reduction minded companies.

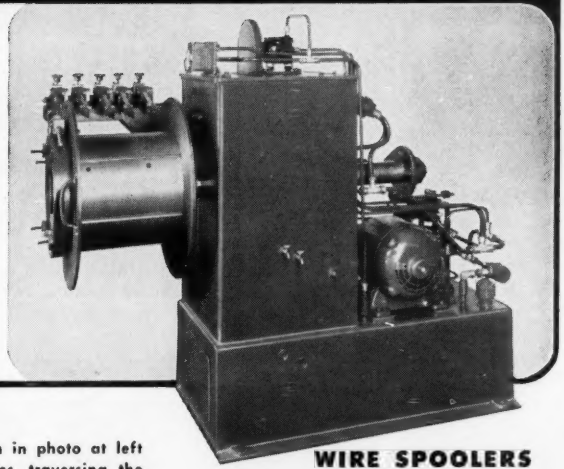
400,000 Tons of Nickel-Copper Ore in Two Giant Blocks Broken in Record Inco Blast

The biggest single blast in the underground mining program of **The International Nickel Company of Canada, Limited,** reduced to handling proportions two giant blocks containing 400,000 tons of nickel-copper ore. The blast, at Inco's vast Frood-Stobie Mine near Copper Cliff, Ontario, required 64 tons of explosives and the drilling of 2,000 blastholes totalling more than 31 miles in length. The

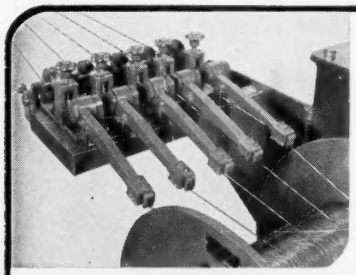
COIL 5 STRANDS IN 1 OPERATION

SECO TRAVERSE REEL SPEEDS UP PRODUCTION

This new SECO Traverse Reel winds five separate coils of flat wire or narrow strip *at the same time.* Coils are oscillated-wound, permitting much longer lengths than conventional ribbon-wound coils. Smooth, powerful hydraulic operation gives coiling speeds as high as desired, accurately controlled from zero to top running speed.



WIRE SPOOLERS
Single and Multiple type. Speeds up to 4,000 feet per minute.



Method of coiling is shown in photo at left The complete block oscillates, traversing the wire into five 3" wide coils. Traverse and tension control are extremely accurate. 1/8" to 1/2" wide flat wire can be wound. Block has 16" inside diameter and 24" outside diameter.

Call or Write for Information and Complete Data — No Obligation

P. O. Box 737, Warrensville Station, Cleveland 22, Ohio

STEEL EQUIPMENT CO.

SECO

broken ore would fill a train of freight cars 14 miles long.

★ ★ ★

So well designed was the blast that only a muffled explosion was heard, less noticeable even than an ordinary blast on the benches, or steps, forming the sides of the open pit. No one in the area realized that so large an explosion had been made except those employed on the job.

★ ★ ★

The blast, climaxing months of careful planning, was the second of its kind at Frood-Stobie this year. Earlier, a 225,000-ton pillar was blasted to pieces for removal to the surface for treatment.

Track-Type Pull-Out for Stranders, Cablers, etc. Introduced

The James L. Entwistle Co. of Providence, Rhode Island, builders of machinery for the wire and cable industry, has introduced a new track-type pull-out machine.

★ ★ ★

Mr. Entwistle, during a recent European trip, observed the traction-tread principle applied to a pull-out operation in a wire mill in France. Investigation revealed that the pull-out was built by Maillefer in Switzerland and he immediately negotiated for patent and manufacturing rights. When he returned to the United States, the J.L.E. research engineering department developed a new advanced design pull-out called the "Caterpuller," using the traction-tread principle for American wire mill operation. The "Caterpuller" will replace any capstan equipment.

★ ★ ★

The "Caterpuller" does not bend or damage cable, eliminates friction because pressure on pulling treads is taken up by rolling action, and considerably reduces required floor space.

★ ★ ★

Horizontal pull is imparted to the cable as it passes between two traction-treads consisting of a series of individual blocks—moulded of tough, resilient, synthetic tire-stock material.

★ ★ ★

Both upper and lower treads are power driven by dual-roller chain and sprocket construction from a common drive shaft.

★ ★ ★

Treads are easily adjustable by means of a hand crank to accommodate the full range of cable diameters. This adjustment also determines the clamping effect on the cable and consequently the available pull.

★ ★ ★

The "Caterpuller" frame consists of a heavy, fabricated-steel upright frame on which the tread slides are adjustable. This upright, in turn, is securely fastened to a substantial steel base which encloses the drive.

★ ★ ★

The company that bought the

WAFIOS

WIRE-WORKING MACHINERY

Wire Netting Machines for Chain Link, Hexagonal Mesh, Poultry Netting, Field Fence. Crimping, Barb Wire and Staple Machines. Spring Coilers. Spring End Grinding Automatics. Loop Benders. Upholstery Spring and Wire Mattress Machines. Wire Nail Machinery. Chain Formers. Chain Welders. Straightening and Cutting Machines. Multi-Slide Wire and Strip Forming Machines. Special Machinery for the making of Paper Clips, Lock Washers, Bale Ties, Key Rings, Tin Openers, Wire Bag Ties, etc. Automatics for Flexible Metallic Tubing.

Sole Agents for Australia and New Zealand: Bliss & Reels Co. Pty. Ltd., 64-66 Little Bourke Street, Melbourne C. 1, Australia.

WAFIOS

SINCE 1893

MASCHINENFABRIK WAFIOS

WAGNER, FICKER & SCHMID REUTLINGEN 3 / WURTT. GERMANY

first "Caterpuller" is so well satisfied that two more have been ordered within three months.

Electronic Flame Scanner

Combustion Control Corporation announces the "Firetron," a revolutionary development in the combusion industry. The "Firetron" is a photo-conductive cell highly responsive to infrared of any flame regardless of the type of fuel used. This single element replaces both flame rod and photo-cell flame detectors, and with its associated electronic circuits distinguishes between fire and any other source of infrared, giving instantaneous and positive response to flame failure. The tiny cell, hardly bigger than a pencil eraser, is plugged into the scanner unit type 48PT1. The single scanner sights through a piece of standard ½-inch pipe where it can view both the pilot and main flames.

★ ★ ★

The "Firetron," with its associated electronic and programming controls, provides flame safeguard for manually-ignited burners and complete programming and flame safeguard for fully automatic burners. These Fireye FP systems carry Underwriters' Laboratories, Factory Mutual Laboratories and Canadian Standards Association approval. For detailed information write to the company at 720 Beacon Street, Boston 15, Mass., for bulletin CP511.

A. S. & W. Appoints Purchasing Agent for Cleveland District

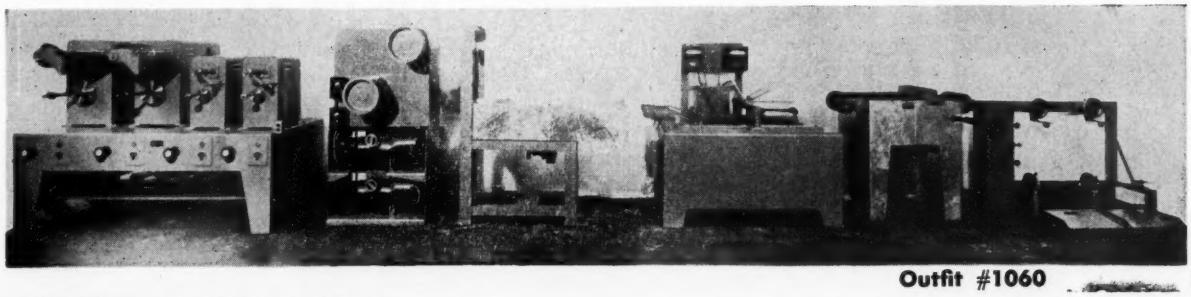
Oliver as Cleveland district purchasing agent of **American Steel & Wire Division,** succeeding **Otto C. Langenhan,** who is retiring November 30 after 45 years of service in the purchasing field, has been announced by Roger W. Berret, purchasing agent of this **U. S. Steel Division.**

★ ★ ★

Mr. Oliver comes to his new post from Worcester, Mass., where he has served for two years as Eastern district purchasing agent for the Division. Named to succeed him in that post was **Elmer R. Johnson,** assistant district purchasing agent of Worcester.

The Instrument Society of America

The New York Section of the Instrument Society of America announces that plans are rapidly developing for the sixth annual Regional Meeting to be held at the Hotel Statler, New York City, February 18, 1953. The technical program consists of these technical sessions covering Process Instrumentation, Power Plant Instrumentation, and Biological Instrumentation, as well as a Vendor's Cocktail Party, followed by a banquet which will have as its principal speaker, H. S. Bean, Chief Capacity, Density & Fluid Meters Section, Mechanics Div. National Bureau of Standards.



Outfit #1060

FOUR LINE TINNING OUTFIT, ESPECIALLY USEFUL TO MANUFACTURERS WITH A VARIETY OF WIRE SIZES TO TIN, BUT WITH SMALL POUNDAGE.

Component units include:

A let-off for 2 small spools for fine wires and 2 large spools for heavy wires.

An acid tank.

A tinning tank, electric heated, with automatic temperature controls, immersion arms and wipers.

A water bath.

A capstan unit and a take-up, arranged for 2 large spools for large size wires and 2 small spools for small wires, each spool spindle driven by a torque motor.

EST. 1855 AIMCO INC. 1915

"American" AIMCO INSULATING MACHINERY COMPANY

REG. U.S. PAT. OFF.

FAIRHILL AND HUNTINGDON STREETS

PHILADELPHIA 33 PENNSYLVANIA U.S.A.

LOOKING AHEAD INTO THE COMING YEAR

Note: The following statements, received too late for inclusion in January, are printed here as a continuation of this annual forecast feature.

by Richard S. Reynolds, Jr., President
Reynolds Metals Company
Louisville, Ky.

There will be plenty of aluminum for all who want it before the middle of 1953, in our opinion, unless there is an extension of hostilities. With the industry continuing to expand its capacity at a record pace, the supply situation in 1953 should be much easier than at any time since the Korean war began.

★ ★ ★

Although the 1952 production, estimated to be close to 1.9 billion pounds, sets a new all-time peak and is 11% greater than last year's output, it does not fully reflect the expansion already completed. The 1952 output would have been greater except for the substantial production losses being suffered by the industry because of the severe power shortages in the Northwest and TVA areas and the delay in new plant construction caused by the steel strike.

★ ★ ★

The big surge in actual production is coming in 1953 and 1954, with an output of 2.5 billion pounds expected in 1953 and about 3.0 billion in 1954. When all of the planned expansion is completed, in 1954, this country's capacity will be about 3.5 billion pounds—a 127% jump since Korea and almost ten times as much as in 1939.

★ ★ ★

Reynolds Metals' 1952 output sets a new record for the Company. Estimated at 552 million pounds, the Company's 1952 output will be over 13% higher than in 1951 and almost 3½ times as much as its peak World War II output. When the Company's expansion program is completed in 1953, its annual producing capacity will be 830 million pounds, more than five times as great as it was at the close of World War II.

★ ★ ★

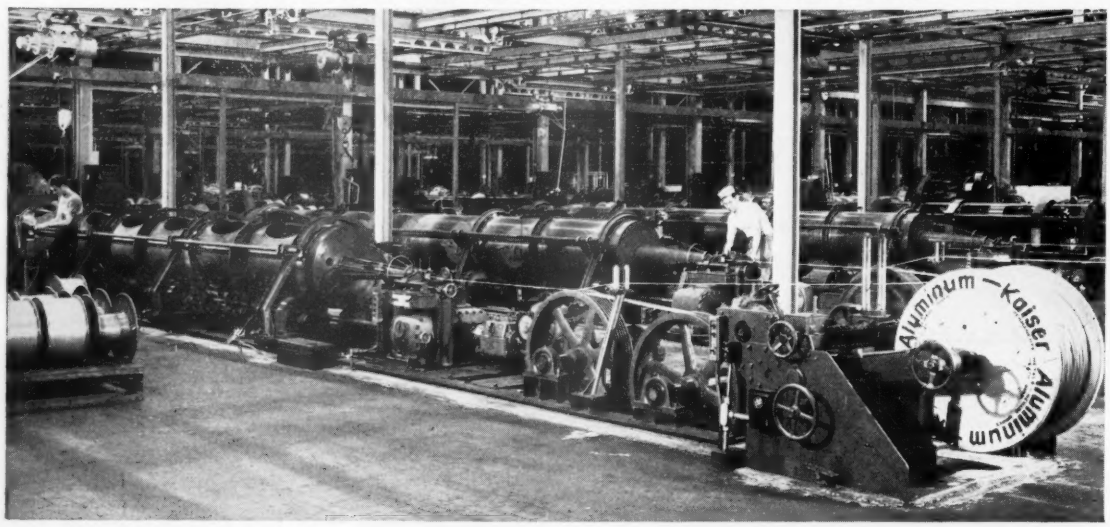
The markets for aluminum continue to grow rapidly as it becomes more plentiful and its usefulness and relative low cost gain recognition by American industry. In the few years since World War II, aluminum has achieved the status of a major basic metal. Aluminum's new prominence and importance is sharply defined by the decision during 1952 of two leaders in the nonferrous metals field to invest over $200,000,000 in aluminum producing and fabricating facilities. With aluminum becoming more readily available, many new uses are developing and the industry will be able to embark once again on an aggressive selling and market development campaign.

---

by A. D. R. Fraser, President
Rome Cable Corporation
Rome, N. Y.

NEW 22" SPOOL 750 RPM TUBULAR STRANDER

HYDRAULIC LIFT REEL STAND — INFINITELY VARIABLE TRAVERSE AIR CONTROLLED
DOUBLE DRUM HAUL-OFF WITH LINK BELT P.I.V. — AIR OPERATED BRAKING SYSTEM



HMT
ESTABLISHED 1846 HUGHESVILLE MACHINE & TOOL COMPANY
WIRE & PROCESS MACHINERY

Hi-Efficiency

Exclusive Representation in Canada by
THE LARSON COMPANY
Toronto, Ontario

HUGHESVILLE MACHINE & TOOL CO.
54 ACADEMY STREET
HUGHESVILLE, PA.
'Phone: 129-A

We are a part of the electrical manufacturing industry which the Department of Commerce conservatively estimates is now a 10 Billion Dollar industry. While no late figures are available for the wire and cable section I would estimate that it runs at least 1¼ Billion Dollars annually. Our business is to supply wire for the electrical industry and it is affected by the growth of every segment of that great industry. One of the most inspiring sights to a manufacturer of wire and cable is to circle at night over any one of the large metropolitan centers and know that every light that is burning and every electrical motor and electrical appliance that is running requires wire to do so.

★ ★ ★

There are about 175 manufacturers of wire and cable in the country with about 30 doing the major percentage of the business. The others are generally small specialized manufacturers. Several of the copper producing and refining companies, such as Kennecott, Anaconda, Phelps-Dodge and American Smelting operate completely owned or partially owned subsidiary companies.

★ ★ ★

Our product line, which started with rods, bare and weatherproof has since been expanded to include cotton, paper, asbestos and glass insulated magnet wire; rubber and plastic building wires, flexible cords, heavy duty portable cords, mining cables of all sorts and descriptions, signal wire, control cables, radio and television cords, non-metallic sheathed cables, overhead and underground high and low voltage cables, insulated aluminum wires and cables, and a wide variety of specialty products for the military and civilian industry using new insulation combinations. These are produced from sizes thinner than a human hair to cables larger than your wrist in diameter in many tens of thousands of different sizes and types.

★ ★ ★

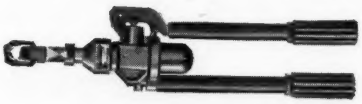
As to raw materials, copper, of course, is our largest item, followed by steel, increasing quantities of aluminum, lead, tin and zinc. We are also sizable users of both synthetic and natural rubber, the vinyl plastics, polyethylene, nylon, cotton, paper, glass, waxes and oils and a multitude of other lesser items. I can only treat briefly on a few of the major materials.

★ ★ ★

Copper has remained a scarce metal throughout the Korean War and the supply continues to be insufficient to meet the demand. Both foreign and domestic mine strikes and unfortunate price regulations affecting the price of scrap and permitting a premium for foreign copper have all contributed to keep the supply below the demand. In June the price of foreign copper was decontrolled and since that time most foreign copper has been sold in United States at about 36½ cents per pound compared with the domestic price of 24½ cents per pound. In June it was estimated that available supply for the third quarter would be 60% domestic and 40% foreign

The Right Cutting Tools

CAN CUT YOUR COSTS, TOO!



MODEL 200-A

NEW, POWERFUL, HAND OPERATED HYDRAULIC CUTTER

Cuts ½" reinforcing rod and other comparable materials with ease. Simple hand pump action develops 8500 p.s.i. exerting 10 tons cutting force. Blades easily removed for resharpening. Weight —15 lbs. Length—24".

MANCO

SPECIALIZED CUTTING TOOLS

Cut reinforcing rod, chain, bolts, wire rope

NEW IN BOLT CUTTERS!

Reversible Jaws Give Double Blade Life

New, exclusive design gives you twice the cutting life from one set of jaws. Handles are *guaranteed against breakage.* Available in 30" size. Capacity, ½" bolts, ⅜" rod. Jaws alone available to fit standard 30" bolt cutters

MODEL 2 MCC

PORTABLE HYDRAULIC GUILLOTINE

Heavy-duty hydraulic cutter provides 22½ tons cutting force yet weighs only 40 lbs. Cuts ¾" reinforcing rod, 1" log chain. Other similar models to cut wire rope. Easy hand pump action. Also available with a variety of power pump units for high speed production cutting.

MODEL 20-A

See Your Distributor or

Write **MANCO MFG. CO.,** BRADLEY, ILLINOIS

Tentative Program

Montreal Regional Meeting

OF THE WIRE ASSOCIATION, MOUNT ROYAL HOTEL, MONTREAL, CAN., MAY 7-8, 1953

GENERAL FEATURES

Registration of those attending the meeting.
Directors' meeting followed by Directors' luncheon with the Program Committee.

Cocktail hour on Thursday the 7th, with banquet in the evening, at which a prominent member of the Canadian Parliament will address the assemblage.

PLANT VISITS

Tours of Canadian Tube & Steel Company's new high carbon wire mill for ferrous members and of Canada Wire and Cable's plant for non-ferrous members will be held.

TECHNICAL PAPERS

A panel discussion on "Inhibitors vs. Accelerators" has been arranged, with representatives of prominent manufacturing firms participating.

A "History of Insulated Wire and Cable in Canada" will be delivered by D. Grant of Canada Wire and Cable Co.

A discussion of "Methods & Time Measurement" will be provided by Leethem-Simpson, Ltd., of Montreal.

A paper on the cold pressure welding of wire is being arranged for that should be of great interest.

ARRANGEMENTS FOR THE LADIES

Suitable entertainment for the ladies who come with members to visit Montreal will include a sight seeing tour and other matters of interest.

Next month we shall give information in greater detail on the above program, including the time schedule for each feature.

The Meeting should be of great interest to wire men everywhere and your committee will look forward to having you with them.

THE WIRE ASSOCIATION

Richard E. Brown, Executive Secretary

453 Main Street **Stamford, Conn.**

and it was ordered by the Office of Price Stabilization that wire mill and brass mill fabricators would have to absorb 20% of the added cost above 24½ cents on foreign copper. This worked out to approximately ½ a cent per pound for the wire mill industry and cost the industry about two million dollars in the third quarter of this year. As an actual matter of fact an additional two million dollars was absorbed by the industry to take care of customers' needs when supplemental quantities of foreign copper were made available. This is indeed a heavy penalty for the wire and brass mill fabricating industry and to our minds outright discrimination against our industry compared to others that have been allowed adequate pass-through of Government ruled price increases. Such vacillating practices have affected the scrap supply and I have had one good authority say that all of these practices since January, 1951, have kept an estimated 175,000 tons of electrolytic copper from reaching normal refinery channels. We do not believe a shortage would exist today if the laws of supply and demand were permitted to operate. If price controls on refined and scrap copper were removed it is our opinion that domestic price would rise moderately and the foreign price would decline somewhat bringing the two prices more nearly in balance.

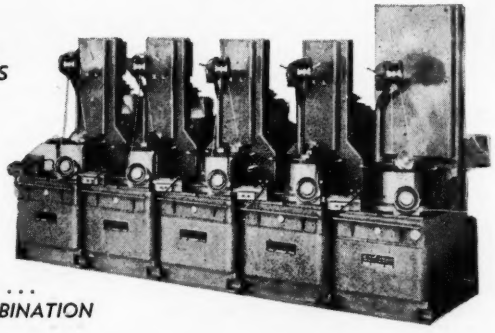
★ ★ ★

The greatest technological advances in our industry have come in the last dozen years. When we started making insulated wire in 1937 natural rubber was the only type of insulation available, with neoprene synthetic rubber for jackets being used experimentally. The late 30's and the advent into the War added the polyvinyl chloride plastics and the buna synthetic rubbers. Then came polyethylene, nylon, silastic rubbers, butyl rubber, teflon, arctic rubber and several others still under development wraps. When you talk with some of our research men they start mentioning cold arctic rubber and then hot arctic rubber and the processing of cold rubber,

AETNA-STANDARD WIRE DRAWING UNIT

- DESIGNED FOR COMPLETE VERSATILITY
- BUILT FOR SAFE, EFFICIENT PRODUCTION
- SINGLE OR MULTI-DRAFT OPERATION
- INTERCHANGEABLE UNITS AND PARTS
- AUTO-RHEOSTATIC SYNCHRONIZATION
- WATER COOLED BLOCKS AND DIES

FERROUS OR NON-FERROUS



WET OR DRY LUBRICANTS

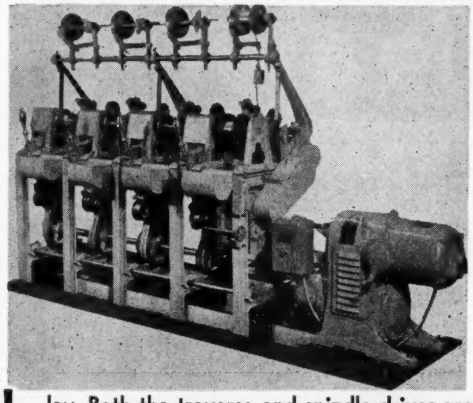
SINGLE UNIT ... OR ANY COMBINATION

THE AETNA-STANDARD ENGINEERING CO.

PITTSBURGH, PA.

ASSOCIATED COMPANIES: HEAD, WRIGHTSON & COMPANY, LTD., THORNABY-ON-TEES, ENGLAND

AETNA-STANDARD ENGINEERING COMPANY, LTD. . . . . TORONTO, ONTARIO, CANADA



1900-HV MULTIPLE SPINDLE SPOOLER

SPECIFICATIONS
Size Range: .010" to .080" or heavier if soft and many flat wire sizes.
Max. Spool Size: 16" flange diameter.
Capacity: usually 4 to 8 spindles.

The 1900-HV Spooler is a rigid, precision machine which will consistently produce a uniform, dense wire lay. Both the traverse and spindle drives are regulated through wide-range, stepless, variable speed units, eliminating change gears. The 1900-HV is completely adaptable to your particular constant or changing demands. All controls are positive. Adjustments are made accurately with the spooler in operation and without tools.

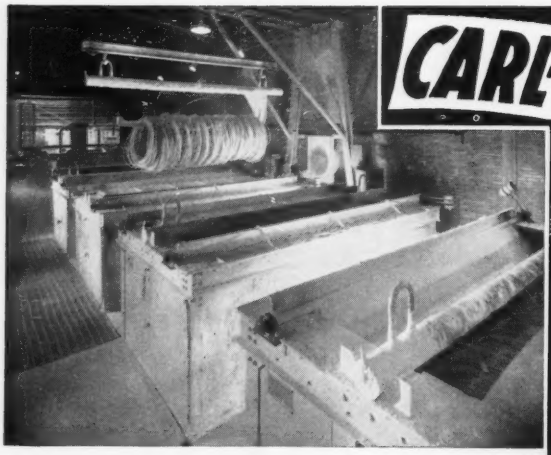
Both smooth acceleration and rapid stopping is obtained through a single lever at each station. Spool changing is simple and rapid. Anti-friction bearings are used on all shafting and spindles.

Your special requirements can be incorporated into the design. Each machine is delivered ready for operation from your power supply. Payoff stands furnished as extras.

Consult us on your spooling problems.

ROBERT J. EMORY COMPANY

31 East Runyon Street Newark 5, N. J.



CARL-MAYER

HI-SPEED REGISTERED

ROD BAKERS

PATENT Nos.
U.S.A.
2,235,559
2,296,361
2,323,828
CANADA
396,144
401,589

ALSO OTHER TYPES OF INDUSTRIAL OVENS AND FURNACES

GREATER SPEED AND FUEL ECONOMY PROVES OUTSTANDING ENGINEERING

Carl-Mayer Hi-Speed Rod Bakers have an exclusive heating arrangement, combining faster baking with amazing fuel economy—and a patented Blow-Off feature which removes moisture without bumping or agitating the coils. *WRITE FOR BULLETIN NO. 350.*

SERVING CONCERNS LIKE THESE:

American Steel & Wire Co.
Atlantic Wire Co.
Atlas Steel Co.
Atlas Tack Corp.
Babcock & Wilcox
Canadian Steel Corporation.
California Wire Cloth Corp.
Colorado Fuel & Iron Corp.
Crucible Steel Co. of America
Eaton Manufacturing Co.
Frost Steel & Wire Co., Ltd.
B. Greening Wire Co., Ltd.
Gary Screw & Bolt Division of Pittsburgh Screw & Bolt Corp.
Hollup Corp.
Indiana Steel & Wire Co.
Johnson & Nephew, Ltd.
Jones & Laughlin Steel Corp.
Page Steel & Wire Co.
Pittsburgh Tool Steel Wire Co.
Republic Steel Corp.
Steel Co. of Canada

THE CARL-MAYER CORPORATION

3030 EUCLID AVENUE
CLEVELAND, OHIO

WIRE DRAWING

FROM .0403" TO .005" (Not Annealed)

FERROUS and NON-FERROUS WIRES

SPECIALISTS IN:

- WIRE STRANDING
- BUNCHING
- SPOOLING
- BRAIDING

Please write to

BUT WITH CONFIDENCE ANCHOR QUALITY

ANCHOR WIRE CORPORATION
183-16 JAMAICA AVE.
JAMAICA 3, LONG ISLAND, NEW YORK

can you blame me if I get somewhat confused?

★ ★ ★

It seems to me that the industrial expansion of our country is building up a terrific amount of business for the investment banking profession in what we hope will be a better climate not only for business operation but for raising venture capital to meet many demands of the programs of private industry. Witness the manner in which the mid-Western utilities accepted the atomic energy plant challenge.

★ ★ ★

Uncertainties still strew the way of American industry. In the case of the copper fabricating industry one of our greatest unknowns is the action of the Office of Price Stabilization on the price of copper. We have absorbed a sizable loss in the last six months owing to having to purchase supplementary foreign copper at 36½ cents per pound to meet our customers' demands. The Renegotiation Board has only settled a very few cases covering the year 1950 and I do not know of any for the year 1951 and here we have almost completed 1952. A program of the military that includes price redetermination of contracts within the sphere of limited allowable costs plus an Excess Profits Tax that takes 70% of profits is a cumulative penalty that robs incentive and is contrary to the principles that build up our private enterprise system. The hazard of determining what are retainable profits that can be distributed in dividends or used for expansion purposes imposes a considerable problem for management today.

Side-Positioning Regulating Control Booklet Available From Westinghouse

Application and operation of side-positioning regulation controls are described in a new booklet available from the **Westinghouse Electric Corporation.** When these automatic photo-electric controls are applied to a web of material, they serve to maintain the traverse

position with relation to the processing machine.

★ ★ ★

Four basic elements are necessary for side position regulating control: (1) a photo-electric scanner that continuously inspects some reference point on the web; (2) an electrical signal interpreter and amplifier; (3) a motor that functions according to the output of the amplifier; (4) a mechanical or hydraulic system to correct web position as directed by the optical scanner.

★ ★ ★

Unwind and rewind stand control are the two main categories of side position control described. Either can be achieved by three types of operation: (1) the simple on-off system with reversing contactor; (2) the continuous system with direct motor excitation; (3) and the continuous system with motor-generator set. Equipment used with each method is described and illustrated, and a "characteristics" chart provides quick selection of the right system.

★ ★ ★

For a copy of this descriptive bulletin, DB 18-530, write Westinghouse Electric Corporation, Box 2099, Pittsburgh 30, Pa.

Copperweld to Buy Ohio Concern

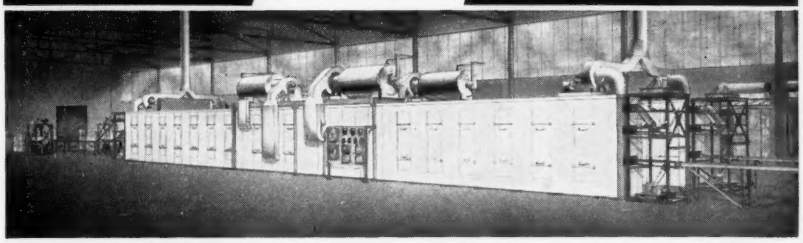
Copperweld Steel Co., Warren, O., is negotiating to purchase the **Ohio Seamless Tube Co.,** Shelby, O. The price is said to be in excess eight million dollars. The purchase will provide Copperweld with a tube mill to handle some of the semi-finished steel from its Warren plant.

★ ★ ★

Frank R. S. Kaplan, President of Copperweld stated that the company has arranged for a $5 million bank loan and for sale of $3.5 million worth of Copperweld convertible preferred stock to a group of investment bankers. He said that no changes in personnel and management are planned, although the two firms might be combined later.

CARL-MAYER WELDING ROD OVENS

PATENT NOS. 1,843,430 2,373,325



One of Several Carl-Mayer Ovens at Hollup Corp.

FAST, EFFICIENT AND ECONOMICAL DRYING OF COATED WELDING RODS.

Only in Carl-Mayer Ovens can you obtain the combination of the recirculating gas fired air heater principle and the "Mayer" patented rod transfer system — two highly important features in ovens of this type.

We also build other types of industrial ovens and furnaces. Carl-Mayer installations are backed by reputation for unusual performance, and over 30 years' experience.

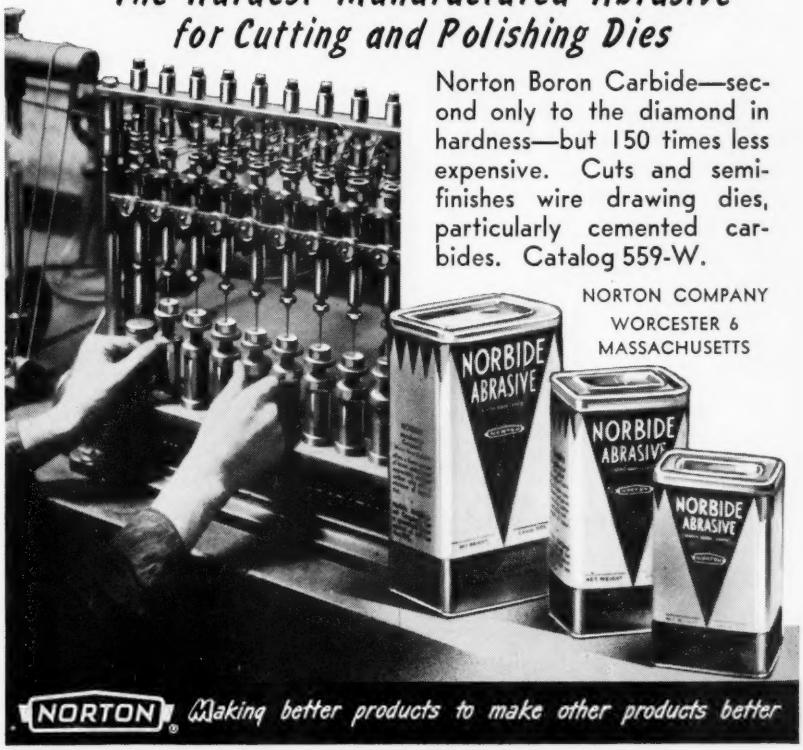
WRITE FOR BULLETIN NO. 350

THE CARL-MAYER CORPORATION

3030 EUCLID AVENUE
CLEVELAND, OHIO

NORBIDE® Abrasive

The Hardest Manufactured Abrasive for Cutting and Polishing Dies



Norton Boron Carbide—second only to the diamond in hardness—but 150 times less expensive. Cuts and semi-finishes wire drawing dies, particularly cemented carbides. Catalog 559-W.

NORTON COMPANY
WORCESTER 6
MASSACHUSETTS

NORTON® *Making better products to make other products better*

High Quality
COPPER and BRONZE WIRE
High Carbon and Low Carbon
Specialty Steel Wire

Spencer wire corporation

★ 555 LEHIGH AVENUE, UNION, N. J.
Plants at Union, N. J., Hillsdale, N. J., West Brookfield, Mass.

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GUARANTEED PURE
Diamond Powders

In All Mesh and Micron Sizes

- Cuts Your Finishing Costs
- Saves Time and Improves Finish Quality
- Meets U.S. Bureau of Standards Specifications
- Immediate Delivery Anywhere

Contact us today!

We Reclaim Diamond Powder From Old Wheels!

●

We Carry a Full Line of Diamond Wheels and Tools!

COLDSET
AMERICAN COLDSET CORP. COURT ST. PATERSON, N. J.

New Tank Lining Announced

The Atlas Mineral Products Company announces the commercial availability of a new type plasticized polyvinyl chloride sheet to supplement its present series of Atlastavon linings. The new product will be designated Atlastavon 20 and will be installed by approved applicators, as well as at the Mertztown and Houston Lining Shops. This product is resistant to alkalies, corrosive salts and most acids including nitric and chromic acids. It is applied by a new technique developed as a result of over three years of research.

★ ★ ★

"If these new methors prove successful," he said, "industry will be in a much better position to carry on production of defense products without being so dependent upon the present industrial diamond source in South Africa."

★ ★ ★

Importance of diamonds to industry was recognized by the National Production Authority when it created a special committee to review the entire problem.

★ ★ ★

Of interest to our industry was an exhibit of silicone varnishes and extrusion compounds and their applications to cords, lead wires, cables, etc., made for extreme high and low temperature or acid resisting applications. They were also shown in tape and sheet forms for electrical uses, in which glass fibers and mica are used for reinforcement or added dielectric strength.

★ ★ ★

Good attendance was recorded, evidencing a desire on the part of many present and potential users to learn more about silicones, the use of which is growing so rapidly that a large expansion project is under way that will enable their several plants to increase production materially.

★ ★ ★

New UHF Transmission Wire

A new "all-weather" UHF transmission line of unique construction has been developed by **Anaconda Wire & Cable Co.** and **RCA Service Co., Inc.** for the benefit of the television industry. The line is in active service on the Pacific Coast.

★ ★ ★

Known as Anaconda ATV-270, the line serves as lead-in from rooftop to receiver. Its ingenious design largely accounts for its performance; it was found to be the most reliable available with lowest losses under adverse weather conditions.

★ ★ ★

Design characteristics include a high-strength Copperweld conductor surrounded by polyethylene spiral thread which acts as centering medium, allowing conductor to float within its individual polyethylene tube.

★ ★ ★

Because dimensioning and spacing of conductors is all-important, the polyethylene tube is carefully and accurately extruded over Copperweld conductors and polyethylene spiral centering thread.

★ ★ ★

Unique inner construction of the outer jacket allows the twin tubes to literally "float in air." Brown polyethylene jacket assures better protection against weather, greater resistance to abrasion, assuring longer life of lines and greater protection against mechanical damage.

★ ★ ★

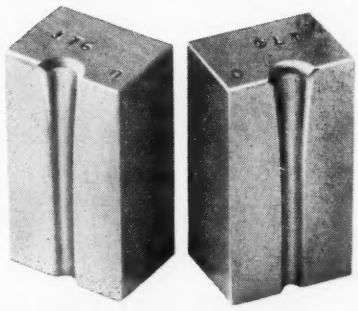
Considerable savings on critical materials, particularly on copper, are represented in the new line. The electrical equivalent in shielded cable (co-axial) would consume 41½ lbs. of copper in 1,000 ft. The Anaconda line uses only one pound for the same footage.

Heavy Duty Trailer Introduced by Phillips

An industrial trailer with a capacity of 120,000 pounds has been developed by **Phillips Mine & Mill Supply Company,** Pittsburgh, Pa. Equipped with eight, solid rubber-tired wheels, this heavy-duty Phil-

Sjogren POINTING DIES

SJOGREN Pointing Dies have proven themselves! Made from shock-resisting high grade steel they assure many hours of hard, continuous usage. Fit your swaging machines with these rugged, S & S Pointing Dies, made to order on your specifications, they guarantee you service.



SINCE S&S 1927

Used by Wire Men Who Want the Best!

SJOGREN TOOL AND MACHINE CO., INC.

WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • CAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

14 SWORD STREET
AUBURN
MASSACHUSETTS

Represented in Canada by THE LARSON CO., 98 Wellington St., West, Toronto, Ont.

2 ELECTRIC PRODUCTIMETERS

"CS" and "Y" ELECTRIC PRODUCTIMETERS
The answer to all electric counting requirements

Two Companion Counters . . . Two Sizes . . . Hi-Speed . . . Accurate . . . Long Life . . . Totally Enclosed

Speeds of 1000 counts per minute. Both counters give maximum readability. Design fits all mounting conditions . . . panel mounting or base mounting. Hardened steel working parts for long life and dependability.

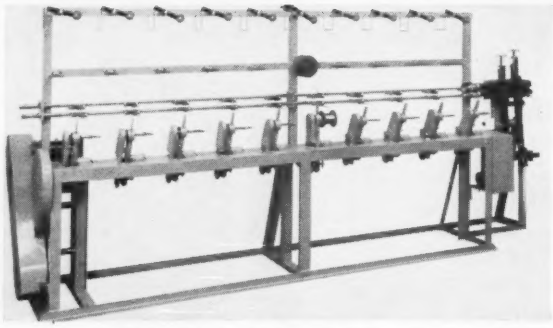
New type case for compactness, rigidity, and protection against dust and moisture conditions. Operate accurately over wide current fluctuations.

DURANT MANUFACTURING CO.
1918 N. Buffum St. Milwaukee 1, Wis.
118 Orange St. Providence 3, R. I.
Representatives in Principal Cities

Write for "New Electrics" Bulletin

PRODUCTIMETERS SINCE 1879 *Count Everything*

PRECISION RE-SPOOLER



10 HEAD TAKE-UP and PAY-OFF

WIRE TENSION CONTROL

PAY-OFF AND TAKE-UP IN ONE UNIT.

Now Used on Wire Down to B&S No. 42.

EACH HEAD INDIVIDUALLY DRIVEN FOR SMOOTH START.
WINDS TWO DIFFERENT TRAVERSE SPOOLS AT SAME TIME.

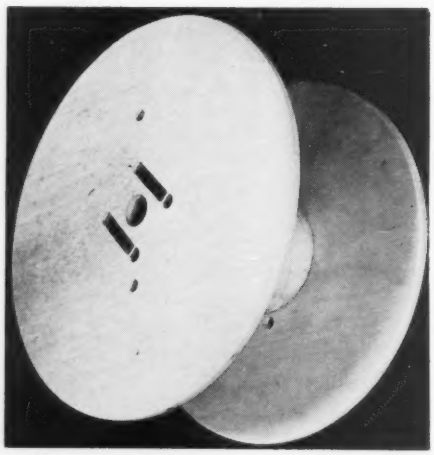
OTHER COOK EQUIPMENT

- Wire Drawing machines
- Bunchers
- Twisters
- Special machinery
- Wire String-Up machines
- Enameling Take-Ups and Pay-Offs
- Enameling machines
- Cabling machines
- Spoolers
- Tinning Take-Ups and Pay-Offs
- Tinning Pots
- Wrapping machines

COOK MANUFACTURING COMPANY

265 NORTH 9TH STREET **PATERSON 2, N. J.**

FINE PLYWOOD REELS



FOR WIRE

Made of air-dried wood, all parts secured with metal strapping. This reel is durable and strong. Heads cannot be dislodged by heavy side load pressures.
Reels shipped knocked down or assembled — metal strapping easily applied by standard metal fastening clips used for boxes, etc.

Heads have accurately fitted dovetail joints that give the reel extreme rigidity. Returnable and non-returnable types, made in head diameters of 6 in. to 22 in.

Shipped to any point in New England by truck
Get the facts on these fine reels

WINCHESTER REEL COMPANY, Inc.

ASHUELOT, N. H. **TEL.: WINCHESTER 163-2**

Our Products Carry Reel Loads.

Trailer has a body framework of "I" beams and channels, with a deck surface of smooth steel.

★ ★ ★

The 120,000 pound-capacity Phil-Trailer is available in two styles: Model TF-1200, with fifth wheel on the front axle only; Model TD-1200, with fifth wheel on both front and back axles for extra maneuverability. To prevent tipping, the design features a wide wheel base and an exceptionally low center of gravity. Construction permits pulling either singly or in train by an industrial tractor.

★ ★ ★

Basic size of this Phil-Trailer is 7′ 6″ wide by 12′ long; however, it can be custom built to greater widths and lengths according to customer specifications. It is recommended by the manufacturer for hauling heavy castings, forgings, finished components, dies and steel.

★ ★ ★

Tramrail Carrier with Hydraulic Scale

A new overhead traveling carrier equipped with a hydraulic cell scale has been built by the **Cleveland Tramrail Division** of **The Cleveland Crane & Engineering Co.,** Wickliffe, Ohio. This permits weighing all loads handled, quickly and easily.

★ ★ ★

The hydraulic cell (not visible in photograph) is operated by a lever to which is fastened the upper hoist block. Resulting pressure is transmitted from the cell to the scale dial by hydraulic tubing. The scale weighs in pounds or kilograms, as desired.

★ ★ ★

The motor-driven tramrail carrier has a travel speed of 300 f.p.m. The hoist has a speed of 38 f.p.m. and a lift of 36 feet. Both travel and hoisting motors are provided with variable-speed controllers; in addition, the hoisting controller is designed for dynamic lowering. Load capacity of this unit is three tons.

★ ★ ★

Careful consideration has been given to safety. A safety switch is provided in the cab and the travel motor is equipped with a foot-controlled electric brake. Also incorporated into the carrier is a weight-type limit switch which permits the operator to travel only when the load block is in high position. This assures clearing through openings of limited dimensions along the travel route safely. A screw-type limit switch is also provided for limiting the distance of travel when lowering.

★ ★ ★

Variations of this unit can be designed to accommodate other loads, speeds and lifting distances as conditions dictate.

Alcoa to Up Cable Capacity

Cable-producing capacity of **Aluminum Company of America's** Vancouver Fabricating Works will be greatly increased in the near future.

★ ★ ★

Construction will start in January. Completion of this phase of the plant's current expansion program is scheduled for late 1953. Just last month work was started on new fabricating ingot casting facilities scheduled to be finished in May at an estimated cost of $1,200,000.

★ ★ ★

Additional modern cable- stranding machines and wire-drawing machines will be installed under the new program. They will produce all sizes of multi-strand aluminum cable and "aluminum cable steel-reinforced," known as "ACSR".

Announce New 90 Degree Spectrometer for X-Ray Analysis

A new 90-degree Geiger-counter X-ray Spectrometer that provides at minimum cost a powerful analysis tool for use in research and educational fields as well as for production control, is now available from the **Research & Control Instruments Division, North American Philips Company, Inc.,**

VINYLS for...

CRITICAL CUSTOMERS

For the past ten years we have specialized in the compounding of Vinyl extrusion and injection molding compounds to specifications, or developing compounds for a specific use.

Underwriters' approved standard compounds are available in all colors for POT, T, TW, 80 Degree C, 90 Degree C and 105 Degree C wires.

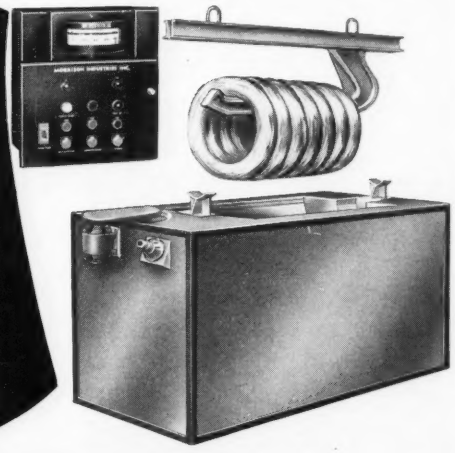
Save your plant space for wire processing equipment. Let us tailor your compounds to bring out the special properties you require.

Your inquiries are invited.

ELECTRONIC RUBBER COMPANY

69 Sunnyside Ave. • Stamford, Conn.

Wire Baking is a MUST when you use this new IMPROVED LOW COST FLASH BAKER



Check These Important Features —

SMALLER — SIMPLIFIED — MORE COMPACT — LOWER COST FLASH BAKER — Can be installed without pit.

FASTER BAKING—due to increased air velocity and reduction in waste space in baking chamber.

GAS OR OIL FIRED — use either fuel instantly.

LESS MAINTENANCE — new ram-jet type burner equipment replaces old style brick combustion chamber with its inherent troublesome features.

SHIPPED COMPLETELY ASSEMBLED — low installation costs.

All of which means a More Efficient Baker.

Write for complete specifications.

MORRISON INDUSTRIES

MORRISON INDUSTRIES, INCORPORATED

17100 MILES AVENUE • CLEVELAND 28, OHIO

BUNCHING
(TWISTING)
AND
STRANDING
IN THE WIRE AND
GENERAL MANUFACTURING
PROCESSES

SPECIALIZED
ENGINEERING
AND
SPECIALIZED
FACILITIES
AT YOUR SERVICE

Expanding application of twisting principles to the production of many products is reflected by an ever-increasing demand for both H-D standard equipment as well as machines especially engineered to solve varied production problems. Week after week surprising new uses are developed through the close cooperation of our engineering department with manufacturers in many fields.

Write today for our New Technical Bulletins. Tell us what you make—or contemplate making and your inquiry will receive prompt attention.

HASKELL-DAWES
MACHINE CO., INC.
2231 E. ONTARIO ST.
PHILADELPHIA 34
PA.

750 South Fulton Avenue, Mount Vernon, N. Y.

★ ★ ★

Designed to provide a full standard range of operation, the new instrument employs a long-life air-cooled X-ray tube and a goniometer having a radius of 130 millimeters. Angular range is minus 10° to plus 90° (two theta). Angles can be read directly from a dial or from a strip chart (degree pen optional). The angle can be varied quickly by a manual drive or by employing the incorporated motor drive. The Geiger-counter position is continuously readable to 0.01 degrees (two theta) over the full range.

★ ★ ★

The high output X-ray generator provides fixed operation at 35 KvP at 6 Ma and operates on 200-240 volts, 50 or 60 cycles. X-ray generator is self-rectified for simplicity and low tube replacement cost. X-ray tube is air-cooled and can be quickly interchanged. Voltage and current stabilizers are included.

New Hand Cleaner Introduced

Magnus Chemical Company, Garwood, N. J. announces the introduction of Magnus Cob Hand Cleaner, an addition to its line of hand cleaners.

★ ★ ★

This product is a light weight free flowing powder containing corn cob meal as the abrasive. It is ideal for use by employees or those desiring a cleaner with a soft, mild abrasive. It is said to do an effective job at a cost of less than 1/10c per wash.

★ ★ ★

Magnus Cob Hand Cleaner contains lanolin and the toilet grade soap used is of mild (pH 7.5) alkalinity. It produces a good lather, and rinses readily.

★ ★ ★

Unlike many vegetable types, this cleaner will not rot, ferment, attract vermin or clog drains.

Save Time

Save Money

...specify
Apco Mossberg
Steel Reels, Spools
and Bobbins first!

Profit from fifty years of Apco Mossberg experience and technical skill in providing copper wire, steel wire and wire rope manufacturers with top quality steel reels, spools and bobbins — investigate the complete Apco Mossberg line today. Apco Mossberg reels, spools and bobbins are available in all sizes and types (single heads, double heads) for every purpose. Write now for complete details . . . get your free copy of the Apco Mossberg Steel Reel Booklet. Apco Mossberg Co., Lamb Street, Attleboro, Mass.

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APCO MOSSBERG CO.
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The original Frank Mossberg Co.

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STEEL WIRES

IF YOU REQUIRE

NO CMP REQUIRED

Submit your
SPECIFICATIONS
To The
REPRESENTATIVES:

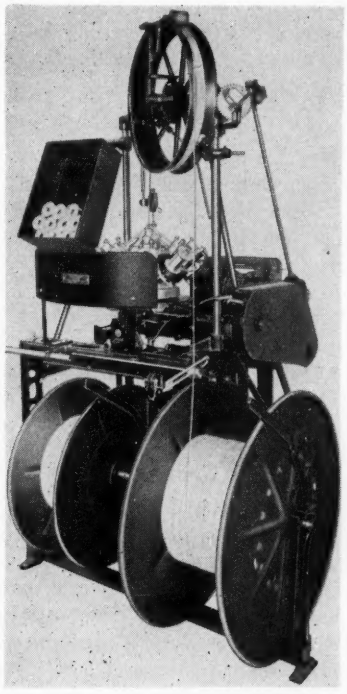
J. GERBER & CO., INC.
855 Avenue of Americas
NEW YORK 1, N. Y.

Magnus Cob Hand Cleaner is sold in bulk only, in 185 and 90 pound drums. A free sample will be supplied upon request on your company letterhead. Send requests to Magnus Chemical Company, Inc., Garwood, N. J. Department W&WP, Garwood, New Jersey.

New Braider Announced

The Wardwell Braiding Machine Company, Central Falls, R. I., makers of the famous "Wardwellian" machinery for the wire and cable industry, have announced the development of a 24-24 carrier double deck braider equipped with variable speed motor for controlling speed, the number of picks by each head being separately regulated by a gear change system.

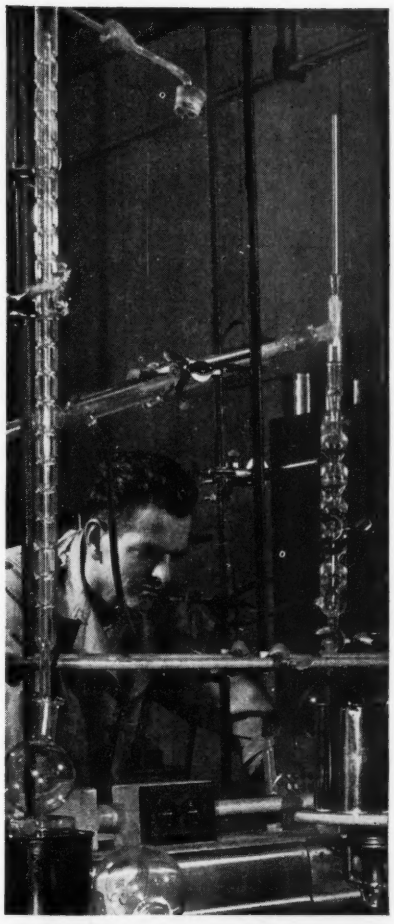
★ ★ ★



Users of this type of braider can appreciate the easy method of reducing the RPM on large diameter wires, also a convenient method of changing gears to get any desired number of picks on each head. This new braider is now in production.

★ ★ ★

For further details write Louis Shulver, Sales and Service Representative, at the address above.



HE'S FINDING WAYS TO SAVE YOU MONEY!

He's not on your payroll. Yet this man is vitally interested in reducing your production costs.

As a skilled technician in New England Lacquer's research department, his main job is to solve your cable coating problems in advance — to help you avoid costly on-the-job slowdowns!

Get complete details about how our research policy can save *you* money. Write today for full information!

The above photograph is one of many contained in an eight-page brochure describing our facilities to serve you. Write for your copy of the complete brochure!

NEW ENGLAND LACQUER CO.
150 KING PHILIP ROAD
EAST PROVIDENCE, R. I.

Here's a Good Tip For Better Lubricating Film... Use

BORAX

• More and more, smart wire mills are switching to a BORAX solution for coating wire-stock surfaces before drawing. They choose BORAX because the residual film it produces stays tight, yet pliable, and is an excellent vehicle for the drawing lubricant. A BORAX solution coats steel wire with just ONE DIP . . . film dries quickly in just a few minutes.

Here Are The Advantages of Borax-Coated Stock:

- **Compatible with drawing lubricant.**
- **Cleaner to handle in transit.**
- **Remains in better condition . . .** *an adequate supply can be stored for weeks without reconditioning.*
- **No cleaning of ends necessary before electric butt welding.**
- **Rust inhibited . . . no oxide film forms.**
- **Can be cleaned most easily.**

WRITE FOR FULL INFORMATION

PACIFIC COAST BORAX CO.

DIVISION OF BORAX CONSOLIDATED, LIMITED

NEW YORK • CHICAGO
LOS ANGELES • CLEVELAND
PHILADELPHIA

MANUFACTURERS OF FAMOUS 20 MULE TEAM PACKAGE PRODUCTS

Wire Concern Moves Into New Plant

The Erie Iron and Supply Corporation has removed its plant to a new building located at 1259 Buffalo Road, Erie, Pa. The new plant contains the office, warehouse and shop and is a building 600 feet long on a railroad siding.

★ ★ ★

The concern carries a stock of 2,500 tons of wire of various sizes on hand at all times, from which they can supply wire straightened and cut to customers' specifications. With 9 machines, they have a capacity of well over 50,000 pounds per day in sizes up to 5/8 inches in diameter.

★ ★ ★

All incoming and outgoing shipments are weighed on a Howe Teleprint automatic scale that is controlled from the office by an electronic arrangement.

★ ★ ★

Erie Iron and Supply is now in its 56th year of operation. Edward A. Zacks, Vice President, represents the third generation. For the past 30 years, besides doing a good business in coiled and straightened and cut wire in this country, they have exported wire to practically every corner of the earth.

American Wheelabrator Moves District Office

American Wheelabrator & Equipment Corp., Mishawaka, Indiana, announces that its district office in New York City has been moved to 53 Newark Street Bldg., Hoboken, New Jersey. Telephones are Hoboken 2-8550 and 2-8551.

★ ★ ★

The move was designed to provide better service to users of blast cleaning equipment, blasting abrasives, chemical and metallurgical dust and fume collectors, and other supplies for foundries and metalworking concerns which are located in the portions of Pennsylvania, New York, Connecticut, and New Jersey served by this office. Sales engineers **David Logan, K. E. Blessing,** and **F. J. Pichard** are assigned to the district.

7 out of 9

WIRE MILLS

that Liquor Finish Wire

use

STANNOUS SULFATE

because

Tin Losses Are Reduced . . .

by elimination of high tin sludging due to incomplete reaction in feather tin method.

Results Easier to Control . . .

only two variables to watch — Stannous Sulphate and Copper Sulphate — allows immediate, simple color adjustment.

Every Batch the Same . . .

M&T Stannous Sulphate method produces smooth, uniform wire coatings, unvarying from lot to lot.

See how use of M&T Stannous Sulphate can help you save tin in liquor finishing. Write for engineering data.

METAL & THERMIT CORPORATION

Chemical Division

100 E. 42nd St., New York 17, N. Y.

Specialists in Tin and Tin Chemicals

FORMING FACTS

72% SAVING IN METAL!

80% INCREASE IN PRODUCTION!

UNIQUE BALANCE CO., INC.

typical results by every user of

NILSON 4-SLIDE

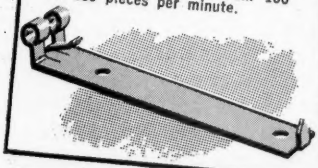
Wire and Ribbon Metal

FORMING MACHINES

You, too, can enjoy tremendous economies **at once.** NILSON combination press and 4-slide forming machines take the stock directly from the coil — feed, straighten, pierce, blank, swage, stamp, coin — perform up to 5 forming operations and cut off . . . all in one quick, precise operation AUTOMATICALLY!

USING A NILSON COMBINATION PRESS AND 4-SLIDE FORMING MACHINE,

Unique Balance Co., Inc. (one of the largest manufacturers of sash balance equipment), now produces 71,532 more parts out of the same amount of steel, compared to their former method. Production speeds increased from 100 to 180 pieces per minute.



For specific recommendations, send prints or samples of your operation when requesting bulletin.

THERE'S NOTHING LIKE A NILSON

THE A. H. NILSON MACHINE CO.
1516 Railroad Ave., Bridgeport, Conn.

Automatic Chain-Making Machines • Automatic Staple Forming Machines • Wire and Stock Reels • Foot Presses • Wire Straightening Equipment • Slide Feeds for Presses

Tin Scarcity a Myth New Booklet Reveals

The plentiful supply of tin in Malaya and the vital role tin plays in the Free World are the themes of a 20-page, illustrated booklet in three colors, published for free nationwide distribution by **The Malayan Tin Bureau,** Dept. 80, 1028 Connecticut Ave., Washington, D. C.

★ ★ ★

The booklet flouts the idea that tin is scarce and denies that Malayan tin producers have formed a cartel to control production and prices. Copies are available upon request.

Bulletin Describes Stapling Machine for Closing Cartons

A four page bulletin describing the "International Boxer," a portable, manually operated stapling machine for closing all types of corrugated and fibre cartons from the outside after they are filled, has been published by **International Staple & Machine Co.**

★ ★ ★

Brief explanations of advantages tell why cartons closed with the unit can be re-used, why they are pilfer-proof and stresses the fact that staple closing does not mar or hide addresses, labels, product advertising copy or illustrations appearing on carton wills.

★ ★ ★

A picture-sequence shows how the retractable anvil stapling head works. Copies of the bulletin (B-101) are available on request to International Staple & Machine Co., 801 Herrin Street, Herrin, Illinois.

Industrial Diamonds May Be Used Less in Machining

American dependence upon industrial diamonds—a critical list item—for machine tool work may be greatly lessened through the development of electrical methods for machining and grinding, **Kenneth R. Beardslee,** general manager of the **Carboloy Department of General Electric Company,** stated recently.

★ ★ ★

HAVING TROUBLE WITH LIGHT WEIGHT REELS FAILING IN HEAVY DUTY SERVICE?

MILTON MACHINE offers you

A SOLUTION TO YOUR PROBLEM that'll save on replacement and maintenance!

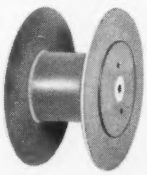
RUGGED STEEL HEAVY DUTY PROCESSING REELS

HEAVY DUTY REEL

Designed for the heavy duty service of a wire rope manufacturer. Flanges with rope brake rim grooves are heavily ribbed semi-steel castings.

WELDED STEEL REEL

Made to wire rope mill's specification to replace light weight pressed steel reels that failed in heavy duty service.



SOLID STEEL PROCESSING SPOOLS & BOBBINS

WRITE FOR BULLETIN 52-W

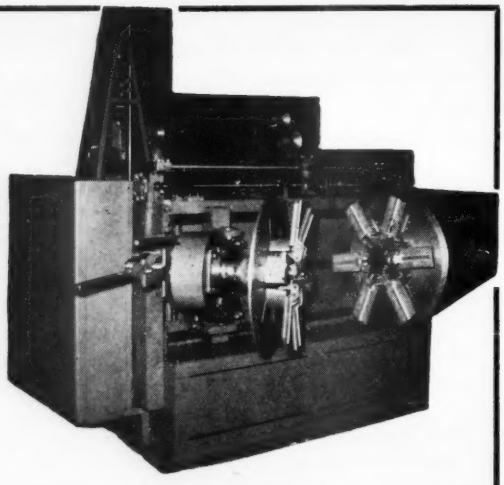
Your inquiries are invited . . . write or phone, our field engineer-representative will be glad to describe our facilities.

MILTON MACHINE WORKS, Inc.
DESIGNERS — ENGINEERS — MANUFACTURERS
MILTON • PENNA.

FULLY AUTOMATIC

CONTINUOUS

COILER and RESPOOLER



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THE MOST ECONOMICAL METHOD OF INCREASING PRODUCTION EFFICIENCY

Your Inquiries Are Invited

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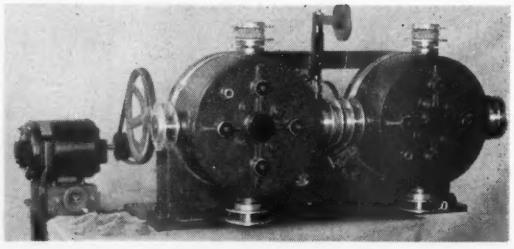
Tel. 2-2192

"ENGINEERED BY MEN WHO KNOW THE BUSINESS"

BOYD CONTINUOUS COIL WINDER #3130

Semi-Automatic



Winds short coils (25′ to 200′) continuously. Traverse wire with layer wind. When proper length is wound, guide is forced by solenoid action to opposing spindle turning at same speed. When sufficient turns are wound on second spindle—a knife jumps between heads and cuts wire connecting the two coils. The head with the full coil indexes upward and an empty coil comes into winding position. Operator then easily removes full coil and ties it as desired. Works particularly well with bell and stove pipe wire. Can be speeded for long coils—slowed for shorter. ½H.P. motor provides ample power. Operator requires no training, skill or experience.

BOYD & SONS MANUFACTURING CORP. 1434-38 Callowhill St. Philadelphia 30, Pa.

Publishes Time-Cycle Controller Bulletin

Publication of a twelve-page bulletin describing its line of Time-Cycle Controllers has just been announced by **The Bristol Company.**

★ ★ ★

Information is given on the application of these controllers in timing industrial process operations, such as those used in the manufacture of rubber goods, moulded plastics, dry ice, tires, coffee, tobacco, rayon, dyeing of woolen goods and many others.

★ ★ ★

The bulletin liberally illustrates the various models available, and describes the principle of operation in detail.

★ ★ ★

Copies of the bulletin, No. C305, are available on request from The Bristol Company, Waterbury 20, Conn.

★ ★ ★

To Represent French Die Concern in the U. S.

Ateliers Ferret-Goglio of Dijon, France, manufacturers of "Diametal" and "Diaferid" carbide wire drawing dies, have announced the appointment of **P. & P. Industries,** 198 Broadway, New York 38, N. Y., to represent them in the United States as their exclusive distributor.

★ ★ ★

Philip J. Terrasi is the general manager of P. & P. Industries. He is an engineer, but also attended N. Y. U., majoring in foreign trade. He served in the U. S. Corps of Engineers during World War II in Europe and North Africa. Mr. Terrasi formed his company in 1947 and has been marketing semi-finished ferrous and non-ferrous metals and diamond tools since then.

★ ★ ★

Moved to Home Office by Sheet & Tube

Ted C. Schraer, manager of the Cincinnati district sales office of

The Youngstown Sheet and Tube Company, for the past 14 years has been moved to general offices in Youngstown as assistant manager of conduit sales.

★ ★ ★

C. B. (Ben) Mullender, connected with the Cincinnati office for the same period, succeeds Schraer as manager of the Cincinnati sales office.

Made General Manager of Firth Sterling Affiliate

Paul Porterfield has been appointed general manager of **The Method X Company,** an affiliate of **Firth Sterling, Inc.** Mr. Porterfield succeeds John S. Roller who resigned from The Method X Company to take up new duties with Firth Sterling, Inc.

★ ★ ★

Rod Descaler Shown at Convention

The Mechanical Wire Rod Descaler, shown by **Fisher Associates** of New York, attracted wide attention during the recent Annual Convention of the Wire Association in Cleveland. Several hundred attending members and guests found their way to the Georgian Room of the Carter Hotel to inspect this new development in wire mill equipment.

★ ★ ★

Designed to remove scale mechanically without recourse to acid-pickling, the machine operates directly before a wire-drawing bench, thereby saving time, cost of acid, and also valuable iron oxide from collection of the scale.

★ ★ ★

Wire men generally seemed to consider the newcomer as a likely solution to one of the industry's more vexing problems: how to clean rods cheaply and effectively, and at the same time rid itself of the nuisance of waste-acid disposal which in recent years has aroused so many communities to war against pollution of its waterways by old practices of dumping.

★ ★ ★

FOR 100 PER CENT
SATISFACTION
USE **WEDGE** REELS*
MADE BY
CARRIS REELS, INC.
SPECIALISTS IN NON-RETURNABLE REELS
RUTLAND, VERMONT
*Pat. Pending

THE MAN who is "YOUR WIRE SUPPLIER"

WIRE STRAIGHTENED AND CUT TO LENGTH
From 16 gauge up to 5/8" diam.
WE WILL FURNISH THE WIRE or STRAIGHTEN and CUT YOUR STOCK.
"Straight as an Arrow"
Telephone: ERIE 4-7139
ERIE IRON & SUPPLY CORPORATION
1059 EAST BUFFALO ROAD, ERIE, PENNA.

Cut Your Product Cost . . .
Stop struggling with wire worries. There's a Continental wire to help cut products costs — to add sales appeal. Let us know about your problem . . . Let Continental's helpful wire service work for you.
CONTINENTAL STEEL CORP. STEEL CONTINENTAL WIRE KOKOMO, IND.
*Trade Mark Reg. U. S. Pat. Off.
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GENERAL OFFICES • KOKOMO, INDIANA
PRODUCERS OF Manufacturer's Wire in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

TUNGSTEN CARBIDE WIRE DRAWING DIES
DESIGNED FOR LONG LIFE AND MAXIMUM WIRE PRODUCTION
Furnished semi-finished to within .001" to .002" of finished size at rough-drilled die prices. Require only light sizing and polishing before using. Our dies embody special design features that make for superior performance.
Also, a full line of carbide tooling for the Cold Heading Industry
EASTERN CARBIDE CORPORATION
NEW ROCHELLE, N. Y.

Top quality non-returnable spools . . . available in standard head and barrel sizes.

Write for a quotation today!

MASON CAN COMPANY
1949 Dexter Rd., East Providence 14, R. I.
MASON CAN COMPANY OF OHIO
Greenville, Ohio

Proponents of mechanical descaling——and many are already in use successfully—claim a major revolution in wire mill cleaning techniques is in the making, comparable to the Carbide Die revolution of the 1930's.

American Brass Opens Office in Cedar Rapids

The American Brass Company announced the opening of a new district sales office in Cedar Rapids, Iowa. **John N. Allen,** formerly of the company's Chicago sales staff, has been appointed district sales manager.

★ ★ ★

The new office, located in the Merchants National Bank Building, becomes the 31st on the company's roster of district sales offices located in major industrial centers throughout the nation. A subsidiary of Anaconda Copper Mining Company, American Brass operates manufacturing plants in Ansonia, Torrington and Waterbury, Conn.; Buffalo, N. Y.; Kenosha, Wis.; and Detroit, Mich. The company's warehouses are located in Chicago, Ill.; Cleveland, Ohio; Milwaukee, Wis.; Philadelphia, Pa.; and Providence, R. I.

Vapor - from - Paper STOPS RUST

Now wire is being protected in storage and in shipment without oil or grease. VPI vapor permeates area within carton. Makes air and moisture harmless to shiny wire surfaces. For "VPI Facts", write: Angier Corporation, Framingham 3, Mass.

ANGIER VPI* WRAP

*Reg. U.S. Pat. Off.
Vapor Rust Preventive

Steel Division of Firth Sterling Appoints Executive

Firth Sterling, Inc., announces the appointment of **Don P. Carr** as assistant sales manager, Steel Division. Mr. Carr came to Firth Sterling in August, 1947.

He had previously been employed by Jessop Steel Co. in Washington, Pa., where he was manager of Bar Steel Sales, and later was appointed manager of sales of a newly formed Carbide and Cast Alloy Division. Prior to this, he was associated with Crucible Steel for five years. Before his recent appointment, Mr. Carr was a salesman for Firth Sterling.

INDUSTRIAL DIAMONDS

VITAL TO THE PRODUCTIVE STRENGTH OF OUR COUNTRY

ARE AVAILABLE FOR ALL INDUSTRIAL APPLICATIONS

INDUSTRIAL DIAMOND ASSOCIATION OF AMERICA, INC.
75 MEMBER COMPANIES
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There is no economic substitute for diamonds

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THE DIAMOND THAT PAYS FOR ITSELF
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INDUSTRIAL DIAMOND ASSOCIATION OF AMERICA, INC.
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THE BETTER YOUR WIRE . . . THE BETTER YOUR PRODUCT!

Choose *Cortland* GALVANIZED WIRE

Fine products are made from fine-quality materials. That's why so many fabricators and formers select Cortland Brand specialized low carbon wires. Cortland Brand wires are among the finest available . . . made from the best corrosion-resisting, open-hearth steel in Wickwire's own mills. Use them for your products . . . in any of the following types, sizes and finishes.

SIZE: coils, spools or straightened cut to length.
FINISH: plain, galvanized, coppered or tinned.
TYPE: stone wire, bookbinder, flat, etc.

Cortland Brand

WICKWIRE BROTHERS, INC.

WB

CORTLAND, N. Y.

NEMA Standards for Electrical Insulating Varnishes, Publication No. IV 1-1952

This is the first publication which NEMA has issued on the subject of electrical insulating varnishes.

★ ★ ★

It contains information concerning the specific gravity, viscosity, drying time, non-volatile content, oilproofness and dielectric strength of the following types of varnish:

1. Spirit soluble.
2. Oxidizing air drying.
3. Thermosetting.
4. Oxidizing baking.
5. Asphaltic.

★ ★ ★

Copies are available from NEMA, 155 East 44th Street, New York 17, N. Y., at $2.50 each.

RECLAIM YOUR

DIAMOND POWDER

with

NATIONAL RESEARCH CO.'S

new and exclusive process. This process is more efficient and recovers higher percentages of greater purity of used diamond powders.

Diamonds from worn grinding wheels, grinding wheel sludge and dust, cotton charged with powder used in die polishing, die washings and diamond bearing scrap — all

RECLAIMED SUCCESSFULLY

Don't waste diamond bearing materials — they're valuable.

Send it to

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***Buy the Best:* MONTGOMERY SILVER-COATED COPPER WIRE**

Round—Hard or Annealed on Spools. Plain or Stranded for HOOKUP and UHF CABLES.

Flat—For Tinsel Ribbons and Tinsel Garlands.

ALSO

Bare Electric Tinsel Conductors for Telephone-Razor-Hearing Aid Cords.

WRITE FOR DETAILS

Send for samples and engineering data.

THE MONTGOMERY COMPANY

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REELS SPOOLS

ALL SIZES

WOOD - PLYWOOD - WOOD - METAL

RETURNABLE NON-RETURNABLE

Samples and Prices on Request

DURKEE MFG. CO. **PINE RIVER, MINN.**

MUSIC WIRE and SPECIAL WIRES

Music Wire for Industrial Purposes

In Over 100 Sizes, Polished and Tinned, from .0015" to .359" in dia.

Aluminum—Annealed—Belt Lacing—Brass, Soft and Spring—Copper, Bare and Tinned Coppered Steel Spring—Galvanized—Tinned
Monel—Nickel Silver—Pure Soft Nickel—Oil Tempered, Steel Spring, Black Finish Phosphor Bronze, Spring Temper—Picture Wire—Iron Wire, Pure—Resistance Wire, Hoskins Chromel "A"—Stainless, Soft and Spring Temper—Tag Wire, 1000 in an Envelope—Florist Wire—Spooled and Coiled, 1/4-1/2-1-5#
Wires Straightened and Cut to length—Small Gauges—Small orders our specialty
Wires and Strands for the fishermen. Trolling Wires, Copper-Monel-Stainless.
Leader Wires, "Wilstabrite" Stainless and "Silverbrite" Music.

THE MALIN & COMPANY

2514 Vestry Ave. Established in 1884 **Cleveland 13, Ohio**

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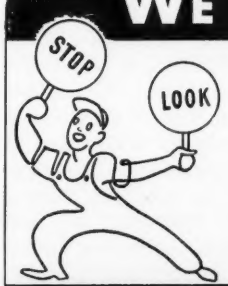

We Pay Highest Prices for Used Machinery

10 NEW ENGLAND BUTT No. 15A TWINNERS — Complete

7 0 WATERBURY-FARRELL 7-Die Rod Wire Drawing Machines

5 12-WIRE 24" Reel TAKEUP STANDS

All Machines Reconditioned in Our Own Shop

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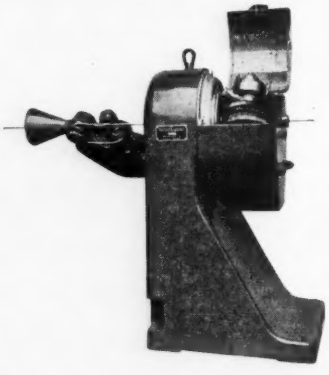
LIME
for
WIRE DRAWING

WARNER COMPANY
BELLEFONTE DIVISION
BELLEFONTE, PA.
Sales Office
Philadelphia—Pittsburgh—New York

LINÉ-GORCY
MECHANICAL
WIRE ROD DESCALERS
(Patented in U.S.A.)



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SOLE AMERICAN DISTRIBUTORS
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New York 17, N. Y.
Telephone: MUrray Hill 5-1937

New Folder on Alodine

In this folder entitled "Protection for Aluminum", the **American Chemical Paint Company** of Ambler, Pa., describe brush "Alodine," which may be applied by a brush-on or spray process to form a tough, durable coating that protects both painted or unpainted aluminum surfaces.

* * *

The steps of cleaning, rinsing, coating and drying are both illustrated and described, together with the equipment required.

* * *

Copies of this folder are available upon request.

Bulletin on Tool Room Dust Collection

How the dust from 27 grinding wheels in the tool room of a leading manufacturer of compressors is being controlled by a standard, pre-tested Dustkop Dust Collector is described in bulletin 637 issued by and available direct from **Aget-Detroit Co.**, Dept. W, Ann Arbor, Michigan.

* * *

Bulletin describes how time and money was saved in obtaining and installing the collector, and also gives the principal specifications of the Model 90N50 collector.

* * *

Development of Electro-formed Copper-Steel Wire

(*Continued from page* 168)

We believe that while this process has so far been applied only to this single product, it has wide applicability to other Bell System requirements, and perhaps also to wires for other purposes. It is obvious, however, that the investment required is such that it could be applicable only to wires used in considerable quantities. We originally estimated, and we have, after one year's operation, no reason to revise our estimates downward, that the manufacturing saving would amount to approximately ½ million dollars a year. This economy is made up of many items,

METAL BOUND
RETURNABLE REELS

Made in 12" to 24" diameters.

No nails used. *All glued construction.* Made of kiln-dried wood. Special design prevents breaking or splintering of wood, protecting insulated wire from damage.

Write for details

WILLIAM McCASKIE, INC.
FORGE ROAD • WESTPORT • MASS.
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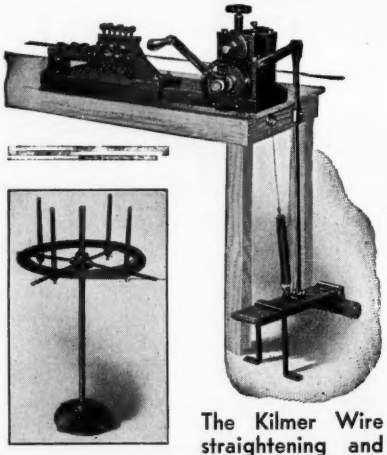
WIRE STRAIGHTENER



The Kilmer Wire straightening and cutting machine is hand operated and recommended for wire No. 8 to No. 19 gauge.
Wire Reel will handle coils up to 150 lbs. with I.D. adjustments from 7" to 22" and 30" O.D.

M. D. KILMER & COMPANY
4840 BROOKPARK RD.
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If you require

precision wire straightening and cutting

in diameter ranges from 1/16" to .005", you'll want to take advantage of the more than a decade of experience that Pittsburgh Cut Wire Company offers all industry. Regardless of what your wire straightening and cutting needs may be . . .

just call on . . .

Pittsburgh Cut Wire Co.

1120 Galveston Avenue
Pittsburgh 33, Pa.

YARNS

For electric wire. Acetate, nylon and silk, natural or dyed. Put up on braider tubes, spools or cops.

OSCAR HEINEMAN CORPORATION

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P. O. Box 1154, Charlotte, N. C.
Tel. Charlotte 8100

one of which is a reduction in the amount of material used per unit length of wire. Through the use of properly selected steel core and the placement of just the necessary amount of copper to provide the required conductivity, we came out with a wire having the previously described properties but being .002" smaller in diameter than the wire which it replaced. This means less copper by 500,000 lbs., less steel by 300,000 lbs. and less insulating and jacketing materials by 300,000 lbs. required to make the 1,600,000,000 conductor feet of drop wire which is our annual production. It appears to us that this reduction in material consumption is an important factor in the National economy and that perhaps it may be in order that consideration be given to using this approach in the manufacture of any wires to which this process is applicable.

* * *

This development, we believe, is an excellent example of the successful coordination and cooperation of the three major classes of engineers—chemical, electrical and mechanical. Each had an essential part of the development as his own province. It was necessary that each establish the limit beyond which he would not go in accommodating the other, but, on the other hand, each had to compromise his own desires and ideals where the other found his demands too burdensome.

* * *

Salt Versus Atmosphere Annealing

(*Continued from page* 157)

range. The salt which we regularly use in our furnaces, composition of which was previously mentioned, has a melting point of approximately 1100°F. and a breakdown temperature of between 1500° and 1600°F. If one has occasion to treat material at any temperature below 1200°F., it would be necessary to change to a salt with a lower melting point to prevent dragout from the furnace, and when this is done, the breakdown point of the salt automatically drops lower which limits the

PORTER CARBIDE-EDGED CUTTERS

for extremely hard materials, including stainless steel.

Stand up under the hardest usage. Tough carbide edges firmly brazed to cutting jaws. Excellent for extra hard materials like stainless steel rods, wires, pins, etc.
#3 cuts to 5/16" diam.
#4 cuts to 3/8" diam.
Pay for themselves many times over!

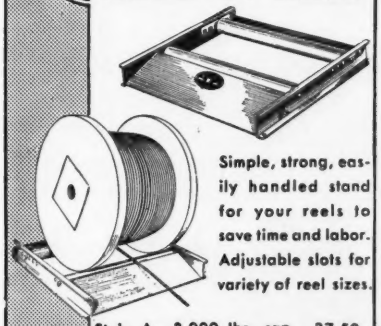
ORDER THROUGH YOUR INDUSTRIAL SUPPLY HOUSE

H. K. PORTER, INC., Somerville 43, Mass.
Manufacturers of PORTER CUTTERS, PORTER PRUNERS and PORTER-FERGUSON Auto Body Fender Repair Tools

Time to Discard **OLD-FASHIONED WAYS**

Jacks . . props . . shores . . horses . . why fool with these obsolete methods of handling reels? DO IT THE MODERN, EFFICIENT WAY! Reel or unreel wire, cable, rope with

ROLL-A-REEL



Simple, strong, easily handled stand for your reels to save time and labor. Adjustable slots for variety of reel sizes.

Style A: 2,000 lbs. cap. 37.50
Style B: 4,000 lbs. cap. 75.00
f.o.b. Cincinnati

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ROLL-A-REEL
327 WEST FOURTH STREET
CINCINNATI 2, OHIO

upper operating temperature of the bath. The system which we have of two controlled atmospheres gives us also a very wide range in the kinds of material which we can handle in our department, both as regards finish and type of material, for at times we have done considerable work reprocessing various Brasses, Bronzes, Copper and Aluminum Wire for the trade. This wide range of material and finishes could not be readily handled in the type of salt equipment which we have in our plant.

★ ★ ★

The feature of being able to produce clean, bright annealed material and anything from a dull steel grey up to super bright finish bright annealed or liquor and/or copper finish bright annealed material is also very valuable to us in our production of regular line product. It is well to bear in mind, however, that one must put into annealing equipment good finish on the product if he is to expect to be able to obtain good finish after the heating cycle. Production people in our mill, as we believe is the case in many other mills, expect atmosphere annealing equipment to perform miracles for them, and this is not the case. The equipment will do, in general, all that can be normally expected of it, but as previously mentioned, the product must be right before entering the furnace and all furnace equipment in good condition and atmospheres properly maintained as to composition and moisture content.

★ ★ ★

BALLOFFET VIANNEY WIRE DIE CO., Inc.

All sizes from .081" down to .0004" in stock from New York.

Manufacturers of Quality diamond dies since 1870

BALLOFFET VIANNEY WIRE DIE CO., Inc.
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Wire Drawing Diamond Dies

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WIRE DIE CORPORATION
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DIAMOND DIES .0006 - .120 DIAMOND POWDER
INDUSTRIAL AJAX SUPPLIES INC.
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NEW ENGLAND WIRE DIE CO.
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EXPERT RECUTTING
DIAMOND DIES, DIAMOND POWDERS
Eastern Representative of
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QUALITY HIGH—COST LOW
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.000's to .102"
For many years . . .
Outstanding in quality, workmanship and service.
FORT WAYNE WIRE DIE, INC.
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WAYNE DIAMOND WIRE DRAWING DIES

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Quality in Diamonds + Perfection in Workmanship = Good Wire.

Satisfactory DIAMOND DIES can only be made by those who have experience, skill and knowledge. WAYNE has all of these. Users have called WAYNE DIES "the best."

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Manufacturers of
CORROSION PROOF MATERIALS
Specializing in
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DANFORTH DIAMOND POWDER
Complete Reclaiming Services
THE C. W. DANFORTH CO.
(Established 1912)
Box 448 Youngstown, Ohio

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STANDARD - METAL-BOUND - SPECIAL
for
WIRE, WIRE ROPE and CABLE
NORTH ANSON REEL CO.
NO. ANSON, MAINE

HAVEG CORPORATION
NEWARK 47, DEL.
Manufacturers of Pickling and Plating *Corrosion-Resistant* Equipment

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1" to 60" Diameters
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★ ★ ★

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★ ★ ★

The summary of our experience with the previously discussed types of equipment is as follows:

★ ★ ★

The salt annealing equipment is for us outstanding for the following:

Low initial investment and maintenance costs.

The best in uniformity of physicals, as regards low and medium low carbon wire, is obtained in salt.

The best possible deliveries are made on annealed in process material. This is very valuable from the standpoint of mill balance, both in daily production and also as regards periods of lower operations. The salt furnaces are easily shut down or coasted at a predetermined temperature without operators.

★ ★ ★

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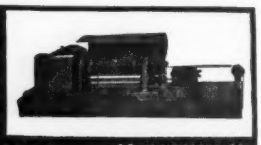
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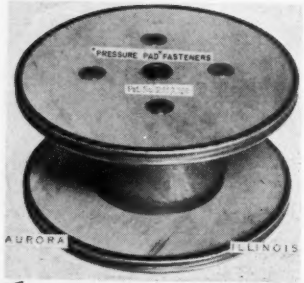

HOWSAM SPOOL COMPANY

with reduced tonnage as the man hours must remain pretty much constant. This type equipment does not lend itself to coasting operations over a weekend or holiday period without operators.

The equipment represents high initial investment and maintenance costs along with greater required supervision than salt type furnaces.

★ ★ ★

I would like to say in closing that we at The Atlantic Wire, considering the type of product which we turn out, would feel greatly handicapped without either type equipment, for each has a very definite range of use in our production picture.

Design of an Oil Fired Galvanizing Furnace

(*Continued from page* 154)

REFERENCES

1. Basic Principles of Combustion Engineering of Hot Dip Galvanizing Furnaces.
Articles 1 to 30.
by Wallace G. Imhoff
2. Modern Heat Application in Galvanizing.
by W. O. Owen
3. Approximate Tables to use for Drawing Up Hot Dip Galvanizing Pot Specifications.
Part I, II, & III.
by Wallace G. Imhoff
4. Hot Dip Galvanizing.
(A Discussion of Causes of Galvanizing Pot Failure at Top of the Kettle.)
by Wallace G. Imhoff
5. Gas-Fired Galvanizing Furnaces.
by Allen M. Thurston
East Ohio Gas Co.
6. Factors to Consider in Hot Dip Galvanizing.
Part I & II.
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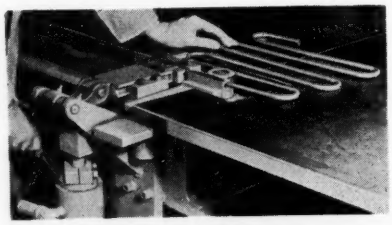
Rockford, Illinois.

New Semi-Automatic Bender Simplifies Serpentine Coil Bending

A new, economical semi-automatic machine for serpentine coil bending is announced by **Pines Engineering Company, Inc.**, of Aurora, Illinois.

★ ★ ★

This small unit is designed especially to fit production line needs. The semi-automatic bender, shown at left, is equipped with a single control lever, a stationary bending form, a rotating wiping shoe, and a semi-circular table to maintain long coils in a horizontal position during the sweep of the bending cycle. The control is arranged so that the operator can conveni-



ently handle the positioning of the workpiece with speed and a minimum of effort.

★ ★ ★

Full details will be sent upon request.

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A. S. & W. Promotions

Floyd A. Garman has been named chief engineer and **Walter V. Magee,** assistant chief engineer of **American Steel and Wire Division,** in a double promotion announced by Walter F. Munford, vice president of operations of this **United States Steel Company Division.**

★ ★ ★

Mr. Garman succeeds **Harry L. Jenter,** who was promoted to assistant manager of operations of the Cleveland District. He began with American Steel and Wire in 1935 as a draftsman. After several promotions he was named works engineer in the Wire Division's South Works in Worcester, Mass., in 1944. Three years later he was made superintendent of engineering and maintenance. He returned to the Cleveland office as projects division engineer in January, 1949, becoming assistant chief engineer on August 1, 1950, a position he has held until now.

★ ★ ★

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c/o WIRE & WIRE PRODUCTS

Wylie Brown Elected Chairman Of Hydropress

Wylie Brown has been elected a director and chairman of the board of **Hydropress, Inc.,** according to announcement by Erwin Loewy, president. Mr. Brown retired last year as chairman of the board of Phelps Dodge Copper Products Corporation, a company he had headed for many years.

★ ★ ★

Hydropress designs and manufactures heavy-duty hydraulic die forging presses and rolling mill equipment. The company is currently building presses of 35,000 and 50,000 tons capacity, believed to be the largest in the world.

J. S. Kline Moved to New Post With Carpenter Steel

John S. Kline has been named divisional controller of the **Carpenter Steel Company's Alloy Tube Division,** Union, N. J. and **Webb Wire Division,** New Brunswick, N. J. His appointment was announced by Frank R. Palmer, Carpenter president.

★ ★ ★

Mr. Kline formerly was auditor of Carpenter's home office in Reading, Pa. He occupies a newly created post to bring closer coordination between the Reading organization and the New Jersey units.

★ ★ ★

Since joining Carpenter in 1945, Mr. Kline advanced through the ranks from the position of accountant. He is a graduate of Albright College.

Surplus New England Butt Braiders
Have quantity No. 2., round style, 24-carrier butt braiders; equipped with short legs and mounted two to a table with one-motor line-shaft drive. 24 inch top-mounted capstand. Hagg low-base bottom latch carriers.
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DIES—Extrusion
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Eyelet
Eastern Carbide Corp., Now Rochelle, N. Y.
Kelly Wire Die Corp., New York, N. Y.

DIES—Pointing
Sjogren Tool and Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc, New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit.
Cochaud Wire Die Corp., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Ft. Wayne Wire Die., Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., New York.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Special Shapes, Etc.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.

DIES—Swaging
Sjogren Tool and Mach. Co., Inc., Auburn, Mass.

DIES—Tube Drawing
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRUMS & TRAVERSES—Flange Steel
Entwistle, Jas. L. Co., Providence, R. I.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

DRYING EQUIPMENT
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio.
Rockwell, W. S. Co., Fairfield, Conn.

ENGINEERS—Consulting
Metal Fatigue—Fatigue of Materials Laboratory, Princeton, N. J.
Wire Insulating and Rubber and Plastics Processing—Hale and Kullgren, Inc., Akron, Ohio
Zinc—Imhoff, Wallace G., Co., No. Highlands, Calif.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FENCING & FENCES—Wire
Interlocking Fence Co., Morton, Ill.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio
Harper Electric Furnace Corp., Buffalo, N. Y.
Rockwell, W. S. Co., Fairfield, Conn.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F. Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engineering Co., The, Cleveland. Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

FURNACES—Heat Treating
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio
Holden, A. F., Co., The, Detroit, Mich.
Morrison Industries, Bedford, Ohio
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engr. Co., Cleveland, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Pot (oil, gas, electric)
Ajax Electric Co., Inc., Philadelphia, Pa.
Holden, A. F., Co., The, Detroit, Mich.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Resistance Heating, Strand
(See Annealing Machines)

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

GALVANIZING EQUIPMENT — (See MACHINERY—Galvanizing Wire)

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

GUIDES—for Wire
Heany Industrial Ceramic Corp., New Haven Conn.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HOOKS—Pickling & Liming
Youngstown Welding & Eng'g' Co., Youngstown, Ohio

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

IMPREGNATING MATERIALS—
Solar Compounds Corporation, Linden, N. J.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INSULATING MATERIALS—
Electronic Rubber Co., Stamford, Conn.
Glass Fibers, Inc., Toledo
Heineman Corp., Oscar, Chicago, Ill.
Merrimac Paper Co., New York, N. Y.
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J.
Solar Varnish Corp., Linden, N. J.

INSULATING MATERIALS — Paper—For Electric Wire Cable
Merrimac Paper Co., New York, N. Y.
Solar Compounds Corporation, Linden, N. J.
Solar Varnish Corp., Linden, N. J.

LACQUERING SYSTEMS — See MACH.—Lacquering Electric Wire

LACQUERS—For Electric Wire
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J.

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LIME—
Warner Co., Philadelphia and Bellefonte, Pa.

LUBRICANTS — For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

LUMBER—Wire Mill, Carload shipments for lagging and car blocking
Canada Reels, Ltd., Bury, Que., Canada
North Anson Reel Co., No. Anson, Me.

MACHINERY—Armoring (Cable, Wire, Hose)
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Glader Machine Works, Chicago, Ill.
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Bolts & Rivets
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany

MACHINERY—Braiding
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Solomon, Michael, New York, N. Y.
Wardwell Braiding Mach. Co., Central Falls, R.I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bunching
Cook Manufacturing Co., The, Paterson, N. J.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Machinery—Winding Wire)

MACHINERY—Chain Making
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
Nilson, A. H. Machine Co., Bridgeport, Conn.

MACHINERY—Closing Rope
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Vaughn Mach'y Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Cold Heading
Waterbury-Farrel Fdry. Mach. Co., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh.
American Insulating Mach'y Co., Phila., Pa.
Hale and Kullgren, Inc., Akron, Ohio
National Mach'y Exch. (Used), New York.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Manco Manufacturing Co., Bradley, Ill.
Mettler Machine Tool, Inc., New Haven, Conn.
Porter, H. K., Inc., Somerville, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Descaling Rod, Dry
Fisher Associates, New York, N. Y.

MACHINERY—Die Making
American Optical Co., Instrument Div., Buffalo, N. Y.
Victor J. Boulin, Inc., New York, N. Y.
Carboloy Dept. General Electric Co., Detroit, Mich.
Firth Sterling, Inc., Pittsburgh, Pa.
Kelly Wire Die Corp., New York, N. Y.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wartenweiler, Emilo, Milano, Italy

MACHINERY—Edging (See MACHINERY — Tandem Rolling and Edging Mills)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, Ohio

MACHINERY—Extruding
Aetna-Standard Engineering Co., Pittsburgh.
Hale and Kullgren, Inc., Akron, Ohio
National Rubber Machinery Co., Akron, Ohio
Royle, John, & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co., Morton, Ill.
Malmedie Maschinenfabrik, Dusseldorf, Germany
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Mettler Machine Tool, Inc., New Haven, Conn.
Wean Equipment Corp. Cleveland, Ohio

MACHINERY—Forming Wire
Baird Machine Co., Stratford, Conn.
Nilson, A. H., Machine Co., Bridgeport, Conn.

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating Wire
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
Fidelity Machine Co., Inc., Philadelphia, Pa.
Hale and Kullgren, Inc., Akron, Ohio
National Rubber Machinery Co., Akron, Ohio
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Solomon, Michael, New York, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Mach. Co., Central Falls, R.I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Inc., Philadelphia, Pa.

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia.
Industrial Ovens, Inc., Cleveland, O.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Interlocking Fence Co., Morton, Ill.

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Providence, R. I.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Baird Machine Co., The, Stratford, Conn.
Glader, Wm., Machine Works, Chicago, Ill.
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Optical, for Dies
American Optical Co., Instrument Div., Buffalo, N. Y.

MACHINERY—Pickling
Chemsteel Construction Co., Pittsburgh, Pa.
Youngstown Welding & Eng'g. Co., Youngstown, Ohio

MACHINERY—Pin Making
Baird Machine Co., The, Stratford, Conn.

MACHINERY—Pointing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale and Kullgren, Inc., Akron, Ohio
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
Morgan Construction Co., Worcester, Mass.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Poulty Wire Fencing
Interlocking Fence Co., Morton, Ill.
Malmedie Maschinenfabrik, Dusseldorf, Germany
Wean Equipment Corp., Cleveland, O.

MACHINERY—Power Transmission
Reeves Pulley Company, Columbus, Indiana

MACHINERY—Pre-Heater for Wire (for Extrusion of Plastics)
Industrial Ovens, Inc., Cleveland, Ohio
National Rubber Machinery Co., Akron, Ohio

MACHINERY—Re-Spoolers
Boyd & Sons Manufacturing Corp., Philadelphia, Pa.
Davis Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Providence, R. I.
National Mach'y Exch. (Used), New York, N. Y.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Inc., Manchester, Conn.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Rubber Insulating
National Rubber Machinery Co., Akron, Ohio
Royle, John & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spark Testing
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spring Making
Carlson Company, The, New York, N. Y.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening & Cutting
Kilmer, M. D., & Co., Cleveland, Ohio
Lewis Machine Co., The, Cleveland, Ohio
Medart Co., The, St. Louis, Mo.
Mettler Machine Tool Co., New Haven, Conn.
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Wartenweiler, Emilio, Milano, Italy
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Stranding
Haskell-Dawes Machine Co., Philadelphia, Pa.
Hughesville Machine & Tool Co., Hughesville, Pa.
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Take-Up and Pay-Out
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Hale & Kullgren, Inc., Akron, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Marshall-Richards Machine Co., Inc., Trenton, N. J.
Standard Machinery Co., Mystic, Conn.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Inc., Manchester, Conn.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Testing, Physical
Scott Testers, Inc., Providence, R. I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phia., Pa.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill, Cold Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale & Kullgren, Inc., Akron, Ohio
Marshall-Richards Machine Company, Inc., Trenton, N. J.
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Tube Winders
Solomon, Michael, New York, N. Y.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
National Machinery Exchange, New York, N. Y.
Solomon, Michael, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.

MACHINERY—for Wire Welding (See WELDERS—Butt and Spot)

MACHINERY—Winding Wire
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L., Co., Providence, R. I.
Federal Manufacturing Co., Wallingford, Conn.
New England Butt Co., Providence, R. I.
Standard Mill Supply, Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Inc., Manchester, Conn.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
Kilmer, M. D., & Co., Cleveland, Ohio

MACHINERY—Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Hale & Kullgren, Inc., Akron, Ohio
Marshall-Richards Machine Co., Inc., Trenton, N. J.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Wire Forming
Baird Machine Co., The, Stratford, Conn.
Kilmer, M. D., & Co., Cleveland, Ohio
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
Angier Corporation, The, Framingham, Mass.
Marshall-Richards Machine C., Inc., Trenton, N. J.
Terkelsen Machine Co., Boston, Mass.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem, Rolling & Edging
Wean Equipment Co., Cleveland, Ohio

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Wickwire Brothers, Inc., Cortland, N. Y.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio
Morrison Industries, Bedford, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

OVENS—Rod Bakers
Carl-Mayer Corp., The, Cleveland, Ohio
Morrison Industries, Bedford, Ohio

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Morrison Industries, Bedford, Ohio

PAINT—Acid Proof
Ceilcote Company, Cleveland, Ohio

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.
Solar Compounds Corp., Linden, N. J.

PAPER—Creped Wrapping
Angier Corporation, The Framingham, Mass.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
Angier Corporation, The, Framingham, Mass.
Terkelsen Machine Co., Boston, Mass.

PATENT ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS — (See COMPOUNDS — Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PICKLING—Hooks, etc. Acid Resisting
Youngstown Welding & Eng'g' Co., Youngstown, Ohio

PICKLING TANK LININGS—
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.

PIPES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio

PRESSES—Hydraulic and Mechanical
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale & Kullgren, Inc., Akron, Ohio
Standard Machinery Co., Mystic, Conn.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio

REEL AND TENSION STANDS—
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Fidelity Machine Company, Inc., Philadelphia.
Industrial Ovens, Inc., Cleveland, Ohio
Kilmer, M. D., & Co., Cleveland, Ohio
Roll-A-Reel, Cincinnati, Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Inc., Manchester, Conn.

REEL CRUTCHES—
Roll-A-Reel, Cincinnati, Ohio
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Canada Reels, Ltd., Bury, Que., Canada
Milton Machine Works, Inc., Milton, Pa.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Metal Bound
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
McCaskie, Inc., Wm., Westport, Mass.
North Anson Reel Co., No. Anson, Me.

REELS—Plywood
Carris Reels, Inc., Rutland, Vt.
McCaskie, Inc., Wm., Westport, Mass.
Nelson Company, The, Baltimore, Md.
Winchester Reel Co., Ashuelot, N. H.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L. Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River, Mnn.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Howsam Spool Co., Aurora, Ill.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
McCaskie, Inc., Wm., Westport, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Mettler Machine Tool, Inc., New Haven, Conn.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio
North Anson Reel Co., No. Anson, Me.
Winchester Reel Co., Ashuelot, N. H.

REELS & SPOOLS—Wooden
Acrometal Products, Inc., Minneapolis, Minn.
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Canada Reels, Ltd., Bury, Que., Canada
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River Minn.
Nelson Company, The, Baltimore, Md.
North Anson Reel Co., No. Anson, Me.
Winchester Reel Co., Ashuelot, N. H.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—(See Ovens—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Pittsburgh Steel Co., Pittsburgh, Pa.

RODS—Wire—Non-Ferrous
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Company, Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
American Steel & Wire Company, Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.

RUST PROOF COMPOUNDS—
(See Compounds—Rust Preventing)

RUST REMOVING COMPOUNDS—
(See Compounds—Rust Preventing)

SALTS—Heat Treating, Descaling, etc.
Holden, A. F., Co., The, Detroit, Mich.

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

SOAPS—Industrial and Wire Drawing
(See Compounds—Wire Drawing)

SODIUM—for Descaling
Holden, A. F., Co., The, Detroit, Mich.

SPOOLS—(See Reels & Spools)

SPOOLS—Stamped Metal for Retail Wire Sales
Clark, J. L. Mfg. Co., Rockford, Ill.
Mason Can Co., East Providence, R. I.

STAMPINGS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Youngstown Sheet & Tube Co., Youngstown, O.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TANKS—Pickling and Plating
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.

TESTERS — INSULATION (See MACHINERY—Spark Testers)

TESTING EQUIPMENT (See MACHINERY Testing, Physical)

TINNING PROCESS—
Metal & Thermit Corp., New York, N. Y.

TINSEL—Electric Conductor
Montgomery Co., The Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper, Silver and False Gold Coated, etc. (See TINSEL—Electric Conductor)

TOOLS—Wire Cutting
Porter, H. K., Inc., Somerville, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRANSMISSIONS—Variable speed (See Machy—Power Transmission)

TRAVERSES & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Inc., Manchester, Ct.

TUBE BENDERS AND FORMERS—
Kilmer, M. D., & Co., Cleveland, Ohio

VALVES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES—for Electric Wire
N. E. Lacquer Co., E. Providence, R. I.
Solar Varnish Corporation, Linden, N. J.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire Insulating Machy., Inc., Manchester, Ct.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

WIRE—Aluminum
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Malin & Co., Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, O.

WIRE—Barbed
Gerber, J., & Co., Inc., New York, N. Y.
Interlocking Fence Co., Morton, Ill.

WIRE—Brass
Chase Brass & Copper Co., Waterbury, Conn.
Spencer Wire Corp., Union, N. J.

WIRE—Brush
Gerber, J., & Co., Inc., New York, N. Y.
Spencer Wire Corp., Union, N. J.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Manufacturing Co., Fostoria, O.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Copper
Chase Brass & Copper Co., Waterbury, Conn.
Gerber, J., & Co., Inc., New York, N. Y.
Spencer Wire Corp., Union, N. J.

WIRE—Flat, Fine
Anchor Wire Corp., Jamaica, L. I., N. Y.
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Gerber, J., & Co., Inc., New York, N. Y.
Montgomery Co., The, Windsor Locks, Conn.

WIRE—Forming
Erie Iron & Supply Corp., Erie, Pa.
Pittsburgh Cut Wire Co., Pittsburgh, Pa.

WIRE—Galvanized
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., New York, N. Y.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Continental Steel Corp., Kokomo, Ind.
Gerber, J., & Co., New York, N. Y.
Johnson Steel & Wire Co., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Newbury Co., The, Boston, Mass.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Manufacturing Co., Fostoria, O.
Spencer Wire Corp., Union, N. J.
U. S. Steel Co., N. Y., N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
American Steel & Wire Co., Cleveland, Ohio
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., Cleveland, Ohio
Newbury Co., The, Boston, Mass.
Seneca Wire & Manufacturing Co., Fostoria, O.
Specialty Wire Co., Inc., Worcester, Mass.
Spencer Wire Corp., Union, N. J.

WIRE—Nickel Silver and Phosphor Bronze
Malin & Co., Cleveland, Ohio
Chase Brass & Copper Co., Waterbury, Conn.

WIRE—Oil Tempered
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester.
Keystone Steel & Wire Co., Peoria, Ill.
Newbury Co., The, Boston, Mass.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Specialty Wire Co., Inc., Worcester, Mass.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Specialty Wire Co., Inc., Worcester, Mass.
Wire Corporation, Worcester, Mass.

WIRE—Steel—Also Coppered and Galvanized Steel
Anchor Wire Corp., Jamaica, L. I., N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Spencer Wire Corp., Union, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Straightening and Cutting
Erie Iron & Supply Corp., Erie, Pa.
Pittsburgh Cut Wire Co., Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.

WIRE—Tungsten
North American Philips Co., Inc., Allied Products Division, New York, N. Y.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WRAPPING PAPER—Creped (See PAPER—Creped Wrapping)

YARNS & TAPES—
Belding Hemingway, New York, N. Y.
Glass Fibers, Inc., Toledo, Ohio

YARN TESTERS—
Heineman Corp., Oscar, Chicago, Ill.
Scott Testers, Inc., Providence, R. I.

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ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE
AND MASTICATING MACHINERY MANUFACTURERS

WATSON

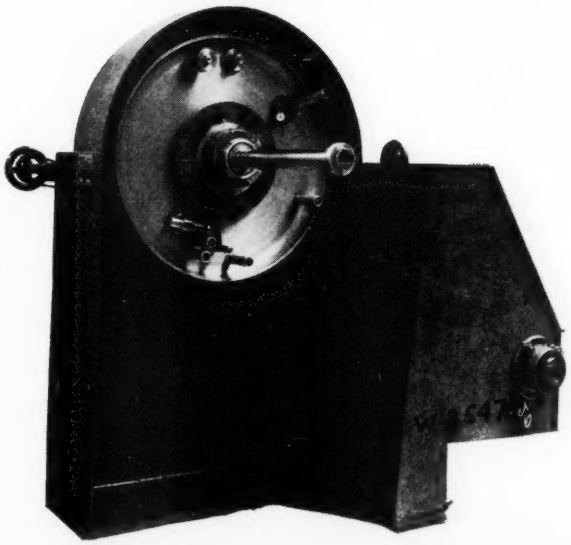
TAPING HEADS TYPE "BT"

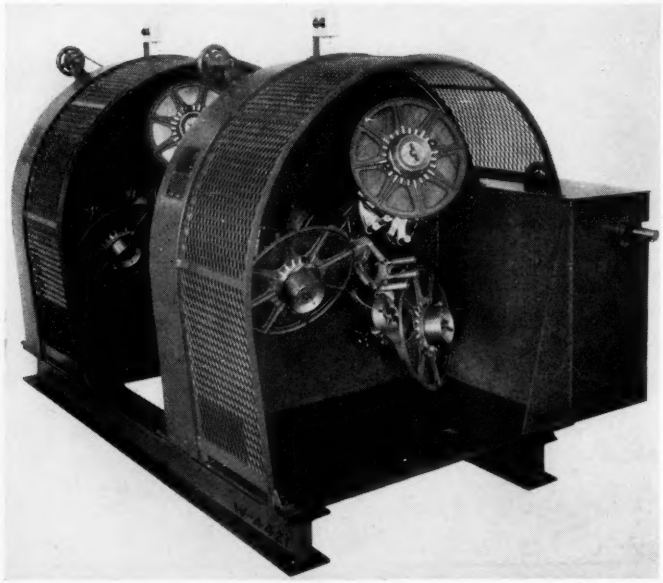
U. S. PATENT RE-22024

THESE UNITS, OFFERED IN SINGLE CONCENTRIC OR MULTIPLE ECCENTRIC DESIGN, ARE WIDELY USED FOR THE APPLICATION OF NON-METALLIC TAPES. OUTSTANDING ADVANTAGES ARE UNIFORM TAPE TENSIONS AND EASE OF ADJUSTMENT. BOTH DESIGNS AVAILABLE WITH EITHER SELECTIVE TUMBLER OR INFINITELY VARIABLE SPEED HEAD DRIVES.

SINGLE CONCENTRIC HEADS

NO. W-2547 SHOWS A 16" SC-BT HEAD FOR 800 R.P.M. OPERATION. THE HIGH SPEEDS MADE POSSIBLE BY THIS DESIGN MAKE THESE HEADS THE IDEAL TAPE APPLIERS IN LINE WITH CABLING OR STRANDING MACHINES WHERE THE TAPING OPERATION GOVERNS THE MACHINE OUTPUT. AVAILABLE FOR 12", 16", 20" AND 24" DIAMETER PADS.





MULTIPLE ECCENTRIC HEADS

NO. W-4421 SHOWS TWO 18" TE-BT HEADS MOUNTED ON A SINGLE BASE. THIS DESIGN IS WIDELY USED FOR MULTI-TAPE APPLICATION. PAD HOLDERS ARE OF LIGHT WEIGHT ALLOY, BALL BEARING CONSTRUCTION WITH A 30°-90° ANGULARITY RANGE, AND HAVE THE ADDED FEATURE OF EXTREMELY SHORT TAPE LEADS FROM GUIDE TO CABLE. OFFERED IN THREE SIZES AND VARIOUS COMBINATIONS.

★ ★ ★

Concentric And Eccentric Metallic Tapers Also Available.

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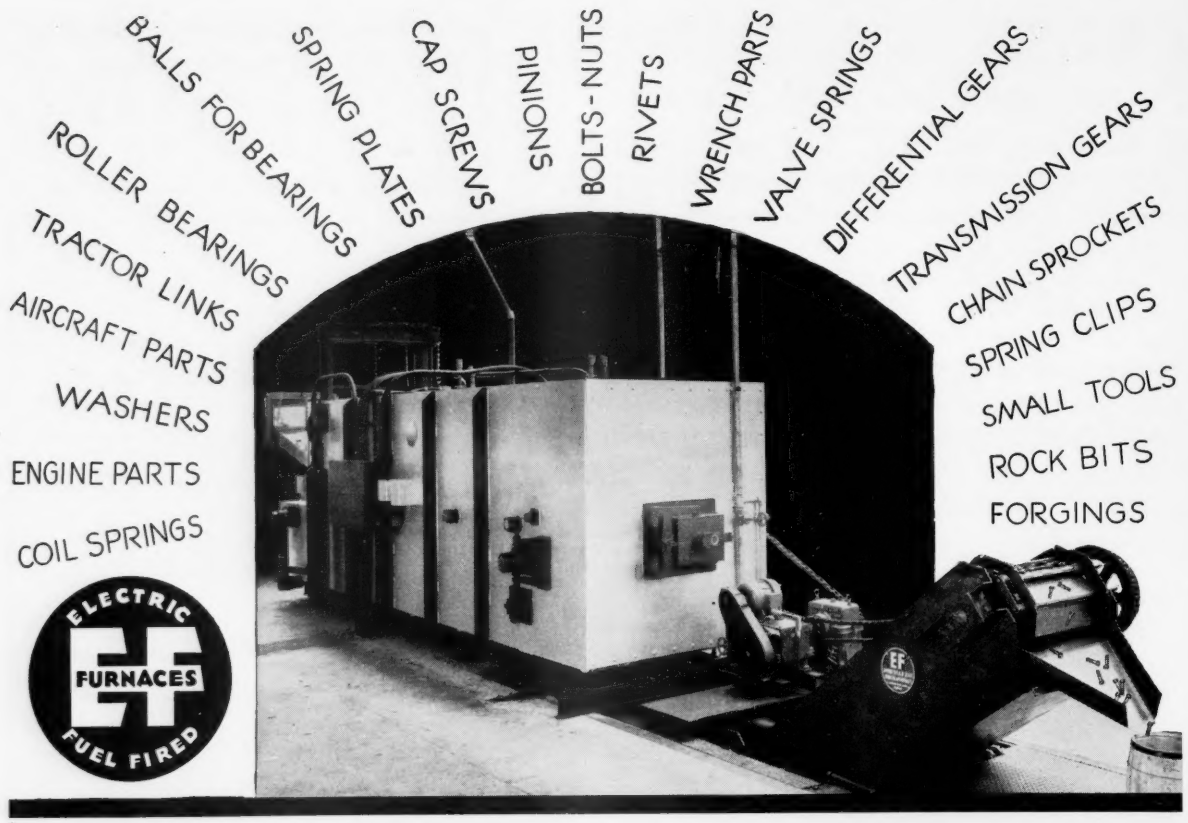
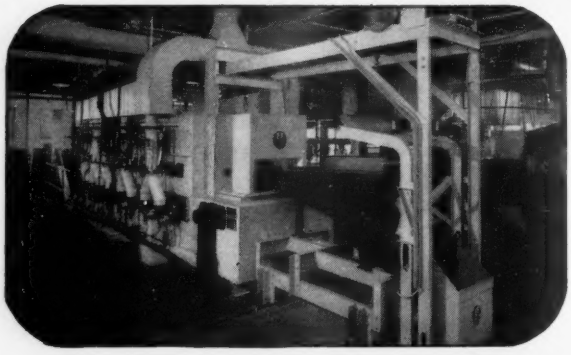


For Hardening Bolts, Springs and Other Small Parts

Uniformly—Scale-free—Continuously, 175 to 2000 lbs. per hr.



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● The E F chain belt conveyor furnace is one of the most satisfactory continuous heating units yet devised for scale-free hardening, carbon restoration and non-decarb heat treating bolts, springs and other small and medium size parts. The material is loaded onto a rugged heat resisting cast link conveyor belt; carried through the furnace; heated uniformly to proper temperature; automatically quenched and discharged. No pans or trays are needed. Hundreds in daily operation prove the dependability and efficiency of our design. 11 standard sizes. Capacities to 2000 lbs. or more per hour. Gas, oil or electrically heated. Furnished complete with any desired feeding or discharging equipment. Write for folders describing our chain belt and other production furnaces.

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